



amateur radio

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MAY
1968

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W.I.A. OFFICIAL BROADCASTS

NEW SOUTH WALES		QUEENSLAND	
VK3WI, Sundays, at 1100 hrs. E.A.S.T.		VK4WI, Sundays, at 0900 hrs. E.A.S.T.	
3595 Kc. a.m.	145.130 Mc. f.m.	3590 Kc.	83.995 Mc.
7146 Kc. a.m.	146.000 Mc. f.m.	7146 Kc.	144.30 Mc.
53.896 Mc. a.m.	(53.950 Mc. f.m. proposed shortly)	14.342 Mc.	
VICTORIA		SOUTH AUSTRALIA	
VK3WI, Sundays, at 1030 hrs. E.A.S.T.		VK3WI, Sundays, at 0900 hrs. C.A.S.T.	
1825 Kc. a.m.	144.500 Mc. a.m.	3.5, 14, 32 and 144 Mc. bands.	
3000 Kc. a.s.b.	145.854 Mc. f.m.		
7146 Kc. a.m.	432.900 Mc. a.m.	WESTERN AUSTRALIA	
53.032 Mc. a.m.		VK3WI, Sundays,	
		TASMANIA	
		VK3WI, Sundays, at 1000 hrs. E.A.S.T.	
		3072 Kc., and re-transmitted by representative stations on—	
		7146 Kc.	144.1 Mc.
		53.032 Mc.	432.6 Mc.

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To do this many items will be offered at cost or below and should interest all.

—ALEX OUTTRIM

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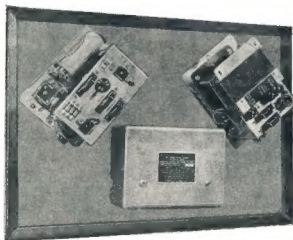
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 Right—Frequency Changer output 75V., 20VA., 25c/s.



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20m Band	14.0-14.6 MHz
15m Band	21.0-21.6 MHz
10m A Band	28.0-28.6 MHz
10m B Band	28.5-29.1 MHz
10m C Band	29.1-29.7 MHz

Communication Method: SSB (A3J)
AM (A 3H)
CW (A1)

Maximum Input Power: (Xmitter final stage)
200W (PEP)

Standard Input Power: (Xmitter final stage)
180W (PEP) 120W on 28 MHz band only

Antenna Input Impedance: 50-75 ohm

Carrier Suppression Ratio: More than 40 dB

Single Side Band Ratio: More than 40 dB

Mic. Input Impedance: High impedance
(dynamic or crystal mic. recommended)

Xmitter Audio Frequency Characteristics:
300-3,000 Hz (-6 dB)

Receiver Sensitivity: 1µV S/N 10 dB
(14 MHz)

Receiver Selectivity: 2.7 kHz (-6 dB)
5.0 kHz (-55 dB)

Spurious Rejection Ratio: More than 45 dB

Image Ratio: More than 60 dB

Undistorted Power Output: More than 1W

Receiver Output Impedance: SP 500 ohm
PHONE 8 ohm

Power Consumption (using PS-500AC):
450W (At maximum power output)
250W (Receiving Mode)

Tubes and Transistors used:
17 TUBES, 3 TRANSISTORS, 15 DIODES
Dimensions: W: 13 1/4"; H: 8 1/4"; D: 11 1/8"
Weight: 17.6 lb

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A PRESIDENT RETIRES!

This story begins in 1950 when a member of the Victorian Division rose to his feet at a general meeting and stuck his neck out by challenging your scribe, then Federal Vice-President, to do some work on behalf of his fellow Amateurs.

Unfortunately for the member concerned he picked an inopportune moment to issue his challenge.

Reason, the Federal Secretary, Major W. T. S. Mitchell, was about to depart for England on a tour of duty in an Army establishment. Federal Executive was looking for a new Secretary, here was a ready-made victim. Hence, counter challenge was issued—result, one George Maxwell Hull entered into a life of toil and self sacrifice.

During the first six years of his servitude he bore the Secretary's yoke, patiently and well, suffered the usual amount of frustration, received the usual amount of abuse, which he accepted philosophically and came up for more.

In order to appreciate fully the value of the service rendered to members by the Federal Secretary, particularly before the days of paid assistance, it is necessary to bear in mind that in 1950 the membership was over two thousand—spread over eight call areas, administered by six Divisional Councils.

This meant, and still means, that in addition to maintenance of communications with the International Radio Union (I.A.R.U.) and its member organisations, the Postmaster-General's Department, and other relevant Government Departments, the Secretary has to satisfy the demands of six Federal Councillors, six Divisional Secretaries and individual members. Furthermore, he must handle the correspondence associated with the co-opted officers filling the posts of Contest, Award, QSL Managers and carrying out other duties—all in an honorary capacity!

So much for the tasks undertaken by the said G. M. Hull during his initiation period. Tasks which he performed well and diligently, emerging a sadder and wiser man, still undeterred, however.

No doubt his earlier training in the R.A.A.F. and the advice contained in that old motto, "Nil Basturdum Carborundum" aided considerably in his acceptance of the vicissitudes of his chosen path.



MAX HULL, VK2ZS

Max rose through the rank of Federal Vice-President to Federal President, without any increase in emolument, a position which he has successfully filled for a total of seven years. During this period he has been elected Honorary Life Member of the Victorian Division (1962).

Had the distinction of chairing Federal Conventions in every State of the Commonwealth.

Been a member of the three-man team representing the Institute at the television hearings in 1956.

Seen W.I.C.E.N. grow from infancy to its present stature.

Was an active member of the Federal Executive which brought about the acceptance of Institute's representative as a member of the Australian Delegation to Geneva I.T.U. Conference in 1959, at which the late John Moyle served us so well.

With other members of Federal Executive arranged with the P.M.G.'s Department the contract enabling the Institute to produce annually an up-to-date "Australian Call Book". As well as obtaining many other concessions for the Australian Amateur.

The completion on acceptance of the Uniform Divisional Constitution, commenced in the 1933-1939 period, took place during his term of office as Federal Secretary.

Witnessed the introduction of new techniques, such as s.s.b. and Moon-bounce and aided in the formulation and acceptance of rules governing the Amateur operations in these fields.

Recorded the deaths of three Federal Officers: John Moyle (ex I.T.U. Liaison Officer), Gordon Weynton (ex member of Executive and Federal Awards Officer), and Alf Kissick (Federal Awards Officer at the time of his death).

This story would be incomplete unless the field of service expected from and given by Max as Federal President was outlined.

The Federal President, in addition to overseeing all the tasks of Federal Officers, is responsible for maintaining good relations with the authorities and associated societies. He is also responsible for the public image and initiating action to improve the lot of the Australian Amateur.

As an active member of the Institute for nigh on forty years, the writer can attest to the fact that based on eighteen years' association with Max, during the whole term of the latter's office, that the Institute has gained much from the enthusiasm and devotion to duty that Max has brought to the offices he has occupied.

You will all undoubtedly agree that it is fitting that his last year of office as Federal President has become noteworthy for the success such achieved in the finalisation of such matters as the re-writing of the "Handbook for Operators of Radio Stations in the Amateur Service".

The completion of plans for Federation of the Institute under a new Constitution. A view that was first expounded in the 30's and received a further fillip when the Uniform Divisional Constitution was accepted.

The growth of membership to over five thousand.

The holding of the first Region III. Conference in conjunction with the (1968) Federal Convention in Sydney.

Past and present members of the Federal Council and Executive who have had the pleasure of serving with George Maxwell Hull are proud of their association with him and the work achieved during his term of office and we are sure all members will join with us in expressing gratitude for his service and express the hope that he will continue to serve the Institute in some less arduous capacity.

—G. GLOVER, Federal Historian.

FEDERAL COMMENT

An Introduction to the Field Effect Transistor

G. S. BYASS,* VK3ZWA (Ex-VK6ZDB)

THE Field Effect Transistor, or FET, has only recently started coming into the consumer electronics field and their prices are now becoming competitive with conventional transistors. A number of articles about FETs have appeared recently in overseas Amateur Radio publications and at least one Amateur receiver, the Davco DR30, is employing these devices.

The purpose of this article is to give an introduction to the Field Effect Transistor, their characteristics and their uses. It is not intended to delve particularly deeply into the theory of their operation as there are a number of good articles on this subject (Ref. 1 to 7), so the theory given in this article will be restricted to a minimum.

The operational characteristics of FETs will be compared with those of conventional transistors and vacuum tubes to enable an appreciation of the advantages and disadvantages of the various devices to be gained.

The theory of the field effect transistor was described by Shockley in 1948 but it was not until about 1960 when semiconductor manufacturing techniques had reached a relatively high state of development that it was possible to produce the FET commercially. In a similar fashion to the development of the conventional transistor, the first FETs were low frequency devices and their prices were high. However, this position is rapidly changing and units capable of v.h.f. operation are now readily available and comparatively cheap.

THEORY OF OPERATION

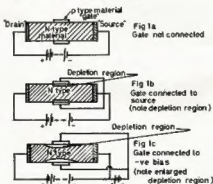
A pure semiconductor material is characterised by a low conductivity because the molecular structure gives rise to very few "charge carriers" within the material. The two most commonly used semiconductor materials are germanium and silicon, and in practice the pure material is "doped" with carefully controlled amounts of impurities to provide the required "charge carriers". A "charge carrier" is a term for either an excess electron or a shortage of an electron within the semiconductor material; a lack of electrons gives rise to P-type semiconductor while an excess of electrons results in an N-type material.

The electrons in the N-type and the holes (or lack of electrons) in a P-type semiconductor material are referred to as the "majority" charge carriers, however in practice there are always present a few carriers of the opposite type and these are referred to as "minority" carriers. Conventional transistors as we know them, make use of both types of carriers and are hence known as "bipolar" transistors. In the case of the FET only the majority carriers are required and hence the FET is sometimes referred to as a "unipolar" device.

In the FET the presence of minority carriers cause undesirable leakage currents and every effort is made to minimise the number of minority carriers present in the material.

The conventional, or "bipolar", transistor relies for its operation on a current flowing between the base and emitter giving rise to an amplified current flow between the collector and the emitter, hence they are referred to as current amplifying devices. The base-emitter looks like a forward biased diode while the collector-emitter looks like a reverse biased diode in the absence of any base current flow. The ratio of collector current to base current is known as the current gain of the device.

The field effect transistor can be imagined as a bar of semiconductor material with a metallic contact at each end, one of these contacts will be known as the "source" and the other as the "drain". Because the contacts are metallic, there is no rectification taking place and the bar of material merely acts like a resistor. Assume that the semiconductor bar is N-type (i.e. has been doped with impurities giving rise to an excess of electrons) and that mid-way between the drain and the source some P-type material is joined to the bar. This will be referred to as the "gate". (See Fig. 1a).



If a voltage is applied between the drain and the source, leaving the gate with no connection at this stage (+ve on the drain and -ve on the source), a current will flow through the device, the magnitude of the current depending on the applied voltage and the resistance of the material.

Assume that the gate is now connected to the source (as in Fig. 1b), and it will be found that drain current will drop sharply and that no current is flowing in the gate circuit. The junction formed by gate and the bar is in actual fact a reverse biased diode although the reason for the presence of the reverse bias is not readily apparent. However, by considering the voltage gradient between the drain and the source it can be seen that because

the gate is between the drain and source, the voltage of the semiconductor bar near the gate must be positive with respect to the source.

If the voltage on the drain is +20 volts with respect to the source, and the gate is midway along the bar, then the voltage in the region of the gate will be 10 volts positive with respect to the source. Thus the PN junction formed by the gate and the bar has a reverse bias of 10 volts and the only current flowing is a very small amount of leakage current which plays no part in the operation of the FET and is undesirable as it lowers the input resistance of the device.

The reason for the drop in drain current is that in the area immediately adjacent to the reverse biased junction formed by the gate there is a "depletion" region formed where no negative charge carriers can exist. As all the current flowing through the device is conveyed by the negative charge carriers and must pass along the bar past the gate area, the reduced area available causes an increased drain-source resistance and hence a reduced current flow. The size of the "depletion" region varies according to the reverse bias on the gate and hence the current flow is dependent on the gate-source voltage for a given applied drain-source voltage (see Fig. 1c). If the reverse bias on the gate is made large enough, it is possible to cut off the drain current completely.

The geometry of an actual device is not the same as this example but the end result is similar and it is easier to visualise the operation this way. There are a number of different types of FETs on the market ranging from audio to v.h.f. types, triodes and tetrodes as well as junction and metal oxide types. The most common is probably the triode junction FET or JFET similar to the type just described although P-channel and N-channel types in both silicon and germanium material are available. These devices are quite rugged and require no more care in handling than conventional transistors.

The metal oxide FET or MOSFET is constructed differently from the junction type as the gate is formed by a metallic layer over the semiconductor bar or channel but separated by a very thin insulating layer of oxide. By this means the input resistance of the device is extremely high, however the insulating layer between the gate and the channel can easily be punctured by high voltages on the gate. The most likely occasion that this insulating layer can be punctured is when the device is being handled before being inserted in the circuit and even the small electrostatic charge applied to the gate while handling the device with the fingers can cause a voltage high enough to break down the gate insulation because of the extremely high gate resistance (up to a million megohms) and the small capacitance of only a few pico-

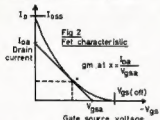
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farads. Hence the leads of the device should be shorted together until after it is inserted into the circuit when the circuit component leakages and capacitances will protect the FET from damage.

Recently some FET's have been produced as tetrodes and these, similar to tetrode vacuum tubes, employ two control elements, or gates, as they are referred to in the case of the FET. The second gate can be used as a control or signal input electrode, but it is usually connected to the source as this results in decreased feedback capacitance which is highly desirable for stability purposes in r.f. amplifiers.

CHARACTERISTICS

The characteristics of a FET are very similar to those of a pentode vacuum tube in that the drain current for a given value of gate bias remains relatively constant over a wide range of applied gate-source voltage. The FET is an almost perfect square-law device which means that the graph of drain current to gate bias follows a square-law curve or a parabola with the transconductance (slope of the curve) increasing with decreasing bias and hence increasing drain current (see Fig. 2). This square-law characteristic means that the harmonic distortion in a FET is essentially second harmonic only and when correctly biased they will give results at least equal to and in most cases far better than conventional transistors or vacuum tubes as regards intermodulation and crossmodulation performance. When operated at the lower portion of the characteristic curve the operation as a mixer is very good because the square-law characteristic ensures that the only unwanted frequencies present after the mixing process are the second harmonics of the mixing frequencies and no other intermodulation byproducts appear.



At low frequencies the input impedance of a FET is very high and almost purely resistive, but as the frequency increases the effect of the gate capacitances start to take effect and the input impedance falls and becomes increasingly reactive in nature. The FET also has the advantage that it is theoretically capable of a lower amplifier noise figure than either vacuum tubes or bipolar transistors and even at this early stage in their development it is only in the u.h.f. region that their performance is surpassed by bipolar transistors.

So far the FET appears to be considerably superior to tubes or conventional transistors, but it is not as simple as all that because there are some inherent disadvantages in the currently available devices. The first of these is

the relatively high (2 to 4 pF.) drain-gate capacitance of the junction FET which means that in common source amplifiers at high frequencies the device becomes unstable. The feedback capacitance in the MOSFET can be somewhat lower than that for the JFET but it can still be a problem in some circuit applications where, similar to the grid-plate capacitance of a triode, it causes positive feedback in certain circuit configurations and hence high-frequency instability. A second difficulty is the effect of increasing temperature which causes a rise in the gate leakage and a decrease in drain current which can cause difficulties when d.c. coupling or d.c. amplification is required. These effects are not, in general, as severe as with bipolar transistors and in any case the majority of Amateur uses employ a.c. coupling between stages where the variations in individual stages is of relatively small importance.

which is the frequency at which the power gain is unity. This is given by the following:

$$f_{u, max} = \frac{Y_{fs}}{2\pi C_{iss}}$$

(This is similar to the case of conventional transistors where the Figure of Merit is designated f_u .)

APPLICATIONS

Amplifiers.—As shown in Table 2 there are three FET amplifier modes—common source, common gate and common drain, corresponding to grounded cathode, grounded grid and cathode follower modes for vacuum tubes. Of these three, the most often used is the common source mode as this gives high voltage gain together with a high input impedance. A comparison of the characteristics of the various amplifier modes is given in Table 2.

In Amateur service the FET, in its present stage of development, can be

FET Parameter	Tube Equivalent	Description
I_{DSS}	—	Gate Cut-off Current, i.e. the leakage current flowing in the gate with the gate reverse biased.
I_{DSS}	—	Zero Gate Voltage Drain Current, i.e. the drain current flowing with zero gate bias.
$V_{GS, off}$	—	Gate-Source Cut-off Voltage, i.e. the reverse gate bias that cuts off the drain current flow.
$ Y_{fs} $	gm	Small Signal Common Source Forward Transfer Admittance.
$ Y_{os} $	—	Small Signal Common Source Output Admittance.
C_{iss}	C_{input}	Common Source Short Circuit Input Capacitance.
C_{rss}	C_{rs}	Common Source Short Circuit Reverse Transfer Capacitance.
$V_{DS, max}$	—	Gate-Source Breakdown Voltage.

Table 1.

Another disadvantage with the currently available FET's is their wide tolerance spread—rather like the early bipolar transistors—and this means that either the circuit must be designed for the worst-case device and consequently considerable negative feedback to allow for the better devices or the circuit values must be tailored to suit the individual FET used. For example, the transconductance of the TIS34 silicon N-channel junction FET is stated as a minimum of 3500 and a maximum of 6500 umhos with the drain current at zero bias varying between 4 and 20 mA. No doubt better manufacturing and sorting techniques will be developed soon to minimise these wide variations between devices with the same type number.

FET PARAMETERS

Some of the more important parameters used for describing FET's are shown in Table 1 together with their vacuum tube equivalents where these are applicable.

In high frequency operation a useful comparison between different devices is given by the Figure of Merit, $f_{u, max}$,

used in the majority of low power applications from audio frequencies to the v.h.f. region. At present FET's capable of high power output are not readily obtainable in either the audio or radio frequency regions, but this is one of the few areas where they cannot be used in the place of conventional transistors or vacuum tubes.

The main fields of use for FET amplifiers in Amateur service are probably as r.f. and i.f. amplifiers in receivers where low noise and freedom from cross-modulation are required and for low level audio pre-amplifiers for both receivers and transmitters. The FET employs similar supply voltages to bipolar transistors with operation possible with very low drain currents, in fact with MOSFET's, the voltage gain is a maximum when the drain current is a minimum and operation is possible with only a few microamps. of drain current.

In r.f. amplifiers it is usual to use the common source mode as this gives a slightly lower noise figure and higher gain than the common gate configuration, however as previously mentioned, neutralising is usually needed at the higher frequencies. Thus if noise figure

is not important and the lower gain can be tolerated the common gate mode is often used. A further alternative is the use of cascode operation which gives a slightly higher gain than the common source stage and in most cases neutralizing is avoided, however two FET's are required instead of one.

The input impedance of a common source r.f. amplifier decreases with increasing frequency because of the gate-source and gate-drain capacitances and at 100 Mc. the input impedance is in the order of 10,000 ohm for a T1534 (the common source output impedance for the same transistor and the same frequency is about 20,000 ohm).

gate has to be forward biased, to a value depending on the device geometry, before gate current will flow. If it is desirable to have "gate current" flow, to stabilise the oscillator amplitude for example, an external diode between gate and source can be used.

There is probably little need to use the FET in a crystal oscillator circuit unless the requirements are particularly stringent as conventional transistors are usually quite adequate for the job and are usually cheaper. It is in the field of self-excited oscillators or v.f.o.'s where the FET is useful.

The high input impedance of the FET means that the tuned circuits are

not "loaded" as much as would be the case with bipolar transistors and the small amount of heat produced means that temperature compensation is less of a problem than with vacuum tube v.f.o.'s. The capacitances in the bipolar transistor depend on both temperature (both positive and negative coefficients depending on the actual temperature) and on the collector current flow. This means that full compensation is particularly difficult and about all that can be done is to isolate the transistor as far as possible from the tuned circuits. On the other hand, capacitance compensation in the case of the FET is somewhat easier as the capacitance has a positive coefficient with temperature and is almost independent of current flow through the device. Thus capacitance compensation is a practical proposition in the case of FET's.

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


	Common Source	Common Gate	Common Drain
			
	Fig. 3 Common source	Fig. 4 Common gate	Fig. 5 Common drain
Input Impedance	High	Low	High
Output Impedance	Moderate	High	Low
Voltage Gain	More than 1	More than 1	Less than 1
Phase Inversion	Yes	No	No
Equiv. Tube Circuit	Grounded Cathode	Grounded Grid	Cathode Follower
Equiv. Trans. Circuit	Common Emitter	Common Base	Emitter Follower

Table 2.—FET Amplifier Configurations.

Mixers.—When two signals of frequency f_1 and f_2 are mixed together in an ideal mixer (unbalanced type) the frequencies appearing in the output are the original frequencies together with their sum and difference, i.e. f_1 , f_2 , $(f_1 + f_2)$ and $(f_1 - f_2)$. In conventional mixers there are also present harmonics of the mixing frequencies together with intermodulation by-products of the form $(1 + n) f_1 - n f_2$, or $(1 + n) f_2 - n f_1$. The FET, because of its square-law characteristic, approaches the ideal and the only significant spurious frequencies generated are the second harmonics of the mixing frequencies, i.e. $2f_1$ and $2f_2$. The gate voltage range, however, must be limited to that portion over which the square-law characteristic holds good and a value of bias giving a drain current of $\frac{1}{2} I_{DSS}$ is a good starting point.

The mixer transconductance is proportional to the oscillator injection voltage, hence by varying the injection voltage the mixer gain can be altered thus giving a further stage to which a.g.c. can be applied. When the injection voltage is small the signal voltage can occupy the entire range of permissible gate voltage which is desirable as maximum gain reduction is required when the signal amplitude is very large.

Oscillators.—Because of the similarity between the characteristics of FET's and triode vacuum tubes the oscillator circuits are very similar except that the analogy between gate current and grid current is not followed. For example, gate current flow is not possible in the case of the MOSFET as the gate is insulated by a layer of oxide from the channel material. The junction FET



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ASYMMETRICAL CRYSTAL FILTERS

Although articles written in this series several years ago were designed to assist with the design and construction of phasing exciters (and I have been referred to in conversations on the air as "The Phasing Man") I wish to make it known that I have had more filters in my shack than many have ever seen. Some have been the result of weeks of abortive experiment to make them asymmetrical, but have steadfastly resisted all attempts to squash them into shape. Even some of the "bought" filters have shown a goodly amount of difference in the height of the upper and lower peaks until they were properly terminated, often with quite a deal of capacitive termination.

Many of the early FT241 "surplus crystal" filters, as described for the "Edmunds" (WJEO) exciter used purposely asymmetrical filters, using shunt crystals to increase the attenuation of the unwanted sideband, and did it very effectively, too. The filter I made used crystals around 430 Kc, because the 80 metre band falls between the 8th and 9th harmonic of this frequency, and for no other reason. Channels from 30 to 35 are suitable.

The method of making and adjusting such filters is described in about three articles in the earlier editions of the A.R.R.L. Sideband Handbook and a filter of this type is used in the "Sideband Package" transmitter which is included in the latest edition of the book. There is no need for further treatment here but the means used to change sidebands by heterodyning with the required signals will be described.

There have been similar filters made at higher frequencies, viz. about 5 Mc., but they have been special designs. The classical example of such a filter is that used by Hallicrafters in their HT82 transmitter, which still sounds as good as anything one can hear on the bands—perhaps better than many of the modern narrower filters.

I have heard of a filter designed by some VK3s which uses six crystals all on the same frequency (exactly) and of the same type and construction. Although I have suitable crystals available, I have not achieved a 100% filter yet and may have to de-tank some of the crystals to reduce their capacitance. I am anxious to avoid this if possible, and still have a few more measures to be tuned. A VK7 has a filter working, so I must not give up yet. I am told that suitable crystals in the 4 to 6 Mc. region can be obtained from Taxl systems where many crystals on the same frequency are extracted from scrapped mobile fm. transceivers. Your v.h.f. boys who buy these sets for net operation may be able to put you onto these. It is a good idea to select a frequency which does not place harmonics in one of our bands. My crystals are on 4456

Kc., which misses all bands by a reasonable amount.

Those FT243 crystals are not always suitable unless you can find matching sets from the same maker in the "all-bakelite" holders, since the metal name plates can cause bother in filters. The plated FT243 crystals should be avoided, too, as their capacitance is high and they are not easily altered. They cannot, of course, be etched.

The system used to produce upper or lower sideband in the "Sideband Package" is shown in Fig. 1. The original upper sideband signal is mixed in one case with the fourth harmonic of the 430 Kc. carrier crystal to produce upper sideband again on the 5th harmonic at 2150 Kc. In the second case beating back from the sixth harmonic produces lower sideband, also on the 5th harmonic.

This output frequency has then to be mixed with other crystal and tuned oscillators to place the output sideband in an Amateur band.

Figs. 2 and 3 show two schemes for mixing the sideband signal with a v.f.o. on the final frequency, in this case, in the 80 metre band. Unfortunately, in Scheme "A" it is necessary to mix the sideband twice after the filter, and levels in the mixers must be watched carefully to avoid unwanted signals. The v.f.o. must be well shielded to avoid "feed-through" and the final balanced modulator must balance well.

Scheme "B" mixes the v.f.o. and carrier crystal to produce the desired upper or lower mixing signal, but the sideband is mixed only once, and the v.f.o., if correctly screened, is less likely to feed through.

The circuits to achieve all of this may get complicated, but in these days of cheap FETs and small components to go with the transistor age techniques, the whole upper/lower sideband generator can be built into a compact unit. Transistor v.f. oscillators seem to radiate less than valve counterparts too.

For the balanced mixers in transistorised equipment, I have found the Collins 4-diode circuits hard to heat, but the balanced FET types using Motorola MPP102s or their 2N3819 equivalents are supposed to be excellent in h.f. exciters. Noise is low and they balance out the carriers better than the equivalent transistor modulators and mixers.

Since very low signals must be used in mixers for best linearity, the final signal requires quite a bit of "lift," and what better to do it these days than one of these integrated circuits now being used to give all the gain required in the i.f. amplifiers of modern fm. radio transceivers. My own experiments with 9.0 Mc. amplifiers using the UA703 integrated circuits are promising, and will probably be included in my i.f. cards in the transceiver at VK5NN.

I sometimes despair of ever completing this transceiver, but as a transistor "training test-bed" it has enabled me to find out a great deal about transistors—sometimes in advance of the younger and cleverer fellows at the "salt mines".

As a final word of warning with transistors—watch your polarities. When checking polarities make certain the red lead on the multimeter is in the positive terminal hole on the case, and the

(Continued on Page 11)

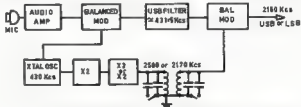


FIG. 1. USB OR LSB GENERATOR AS USED IN THE "SIDE-BAND PACKAGE"
(Output on Freq. \pm 5% Fixed Frequency.)

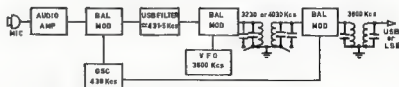


FIG. 2. SCHEME "A" MIX USB TWICE TO FINAL FREQUENCY.

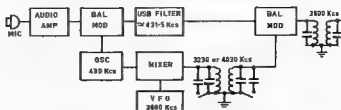


FIG. 3. SCHEME "B" MIX USB ONCE TO FINAL FREQUENCY.

RADIO AUTOMATIC TELETYPE MAKE EASY

D. R. STOKES,* VK2ZPM

GENERAL PRINCIPLES

Two main systems exist. They are FSK, Frequency Shift Keying, and Two Tone Transmission.

FSK.—In this system the transmitter carrier frequency can be shifted by a specified amount either side of the centre frequency by the operation of the teleprinter keyboard. This shift is usually 425 cycles either side, giving a total shift of 850 cycles. When the signal is being received, the receiver b.f.o. is used to detect this shift in carrier, the resultant two tone signal is then used to key the teleprinter. These tones are usually 2125 cycles, for a mark and 2975 cycles for a space.

Two Tone.—In this, the transmitting terminal has a two tone oscillator and the frequency of this is controlled by the operation of the teleprinter keyboard. The oscillator is an audio type set to 2125 cycles and shifted to 2975 cycles by the operation of the keyboard contacts. This tone is then amplified and fed into the modulator of any transmitter that is capable of transmitting audio signals. In this case the b.f.o. in the receiver is not required as the audio tones are already present and fed directly into the converter.

message is printed on this. In some Model 14s, coded holes are also punched into the tape so that the message may be re-transmitted.

The Model 15, 19 and 28 Teleprinters are page printers similar to an electric typewriter.

The teleprinter consists of an electric motor which actually causes the machine to function, and a selecting mechanism that switches the machine from mark to space. Each character is made up of a number of mark and space impulses, which go to make up the five-unit teletype code. The motor requires a.c. while the selector magnets require almost any voltage between 24 volts and 100 volts d.c. with 60 mA. flowing.

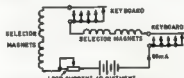


FIG. 3. LOOP CIRCUIT USING TWO TELEPRINTERS.

The selector magnets are actually two coils that can be connected in series or parallel. For series operation, 60 mA. is required, while only 30 mA. is required when they are in parallel. I have found that the 60 mA. operation is more suitable for better copy.

As each machine is fitted with an electric motor, these must always be operating at the same speed, in other words sending and receiving teleprinters set to the same speed.

Most printers are fitted with a keyboard. When a key is depressed contact is made and a definite teletype code is set up. The keyboard is mechanically coupled to the motor but not electrically. The keyboard contacts are not directly connected to the selector magnets, but must be placed in series with them, to operate the machine on a local loop.

THE CONVERTER

The two tone output from the receiver is fed to a 12AX7 limiting amplifier, via a matching transformer. The 12AX7 is cathode coupled, limiting at about minus 4 dbm. This is coupled to a 6C4 which amplifies the tones before application to the discriminator filter. The filters are tuned to exactly 2125 cycles and 2975 cycles. The incoming tones are fed across both filters, but only the required tone will be allowed to pass, as the filters will have a low impedance to all other frequencies present. The output from each filter is passed on to a voltage doubler, consisting of two diodes in each side. These can be either OA85, OA5 or similar, the d.c. voltage being developed across the 470K ohm diode load resistor in the grid circuit of the 12AU7. This d.c. will cause one side of the valve to conduct, thus causing the polar relay to operate in the same manner.

A normal reverse switch is fitted between the output of the filters and the diodes so that the mark and space frequencies can be reversed. In the cathode of the 12AU7 a variable resistor is fitted so that the converter can be balanced and each side will draw the same current for mark and space. Another variable resistor is fitted between the anodes of the 12AU7, this is the relay bias and is set so that the two coils of the relay will be balanced. When this is being adjusted, the two cathodes of the 12AU7 are connected together and earthed via a 4K ohm resistor. Once the bias is set it need not be adjusted again unless a new relay is fitted. The balance potentiometer is normally used to balance the mark and space signals.

TRANSISTOR KEYS

The contacts of the polar relay can either key a 100 volt d.c. loop to operate the teleprinter, but arcing of the relay contacts will occur. This also



FIG. 1. SIMPLE LOOP CIRCUIT ONE TELEPRINTER.

MACHINES

Many different types of teleprinter exist, the more popular types being made by the American Teletype Corporation. These are Models 14, 14S, 15, 19 and 28. The Model 14 Teleprinters use an 11/16 inch paper tape and the

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NOTE:

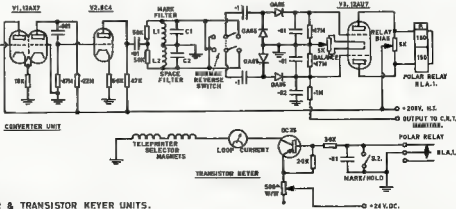


FIG. 3. CONVERTER & TRANSISTOR KEYS UNITS.

causes radio interference. A more suitable system is to use the relay contacts to key the base circuit of a transistor, where there is little current, and using the transistor as the switch. The transistor has to be able to sustain the 60 mA. loop current, OC35, OC36, etc., were found to be suitable.

24 volts d.c. is used to provide the local loop circuit via the transistor switch. The loop current control is set for 60 mA. on a mark. It will be found that a small current will flow in the loop on space but it will not be enough to upset the keying pulses.

TWO TONE OSCILLATOR

This consists of a 12AT7 oscillator on 2975 cycles, using a centre taped coil of about 88 millihenries and capacitors to set the frequency. A "dry shift" keying circuit using two diodes (OA85, OA5, etc.) connect extra capacity across the coil when the keyboard contacts are closed, thus lowering the frequency to 2125 cycles. The 0.03 uF. capacitor across the coil is adjusted for the 2975 cycles tone, the second half of the valve acting as a straight audio amplifier.

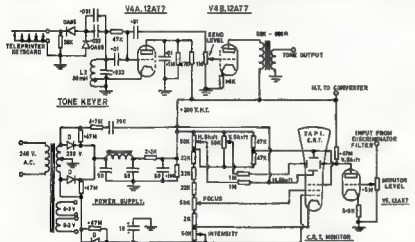


FIG. 4. C.R.T. MONITOR - TONE KEYS & POWER SUPPLY.

C.R.T. MONITOR

A 2" cathode ray tube is used for a tuning indicator. Either the mark or space d.c. signal to the grid of the 12AX7 is fed to the grid of a d.c. amplifier, which used half of a 12AX7. The anode is directly connected to the vertical plates of the c.r.t.

A small portion of the 50 cycles a.c. is used as the horizontal sweep. The 4.7 meg. resistor and the 390 pf. capacitor are adjusted so that the trace just extends across the face of the tube. The gain control in the grid of the 12AX7 controls the amount of separation from mark to space.

When the teleprinter speed is set for 50 bauds, 67 words per minute (w.p.m.), the figure eight pattern on the c.r.t. will appear stationary, but when the 50 cycles sweep frequency, but when the incoming signal is at 45 bauds (61 w.p.m.) the trace will switch back and

forth. By this means the speed of the incoming signal can be seen.

When the receiver is correctly tuned the mark or space voltage at the grid of the 12AX7 will be at a maximum and this can be viewed on the monitor.



FILTER CONSTRUCTION

The filters consist of two band pass filters tuned to 2125 cycles and 2975 cycles. The basis of each is a coil having an approximate inductance of 88 millihenries. These coils can be either old P.M.G. telephone loading coils, in which case the two coils are connected in series aiding to give the required inductance, or wound on Ferroxcube "D" type cores. These require approximately 720 turns of 26 B. & S. enamel wire to obtain the 88 millihenries. This

relay to one side. A tone of 2975 cycles is then fed into the converter and this will move the polar relay to the other side.

Frequency stability of the receiver is essential, but most good quality communications receivers are suitable. A period of time should be allowed for the receiver to stabilise before a station is printed.

When the receiver does drift, the resultant two tone signal frequencies will fall outside the pass band of the receive filters and only rubbish will be printed.



FIG. 5. FILTER TEST CIRCUIT.

The teleprinter keyboard and page printer can be checked by simply placing them in series in the local loop and typing. Alternatively, the output from the two tone oscillator can be fed into the input of the converter. This is known as "back to back" testing and proves the operation of the teleprinter and the converter.

One additional switch was fitted in the converter. This is a "mark hold". When this is operated, the receiver can be returned or altered. The switch is across the contacts of the polar relay and places the teleprinter on a permanent mark.

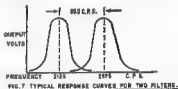


FIG. 7. TYPICAL RESPONSE CURVES FOR TWO FILTERS.

A simple 100 volt loop current supply can be made by placing an OA210, OA211, etc., as a half wave rectifier across the 115 volts motor supply. **Note.**—This must not be placed on the transistor keyer.

If a tape recorder is in the shack and it has a reasonable frequency response, the two tone signal from the receiver can be recorded and played back into the converter for test purposes when there are no stations on air.

SIDEBAND

(Continued from Page 8)

black lead in the negative hole. Failure to do this for an Avo "8" was responsible for a rather expensive debacle which came to my notice. My own JA multimeter has this one covered as the red lead will not go into the black hole in the meter case. Diodes in the power supplies are good insurance—but don't overlook "bias" supplies.

73 for now, Phil VK5NN.

inductance is not critical, but the coils want to have a reasonably high Q.

To test the filters a simple circuit (Fig. 6) can be set up. A 100K ohm resistor is used to isolate the audio oscillator from the filter under test. Capacitors are placed in parallel with the coil until a definite peak is found at the required frequency. After this, a frequency response curve can be easily obtained by plotting output volts against frequency.

A vacuum tube voltmeter or c.r.o. is the best to measure the output voltage, but a high resistance voltmeter can be used. It does not matter if the response curves are a little broad as this will make any frequency drift in the receiver less noticeable.

CONCLUSION

After the converter has been set up an audio tone of 2125 cycles is fed into the converter. This will take the polar

SIMPLIFIED ANTENNA SWITCHING FOR H.F. BANDS

GEOFF WILSON,* VK3AMK

Operation on the h.f. (80-10 metres) bands requires the use of at least two separate antennae if reasonable efficiency is to be achieved and a fair share of DX worked. An antenna designed, say, for 20-10 metres will obviously be useless when 80-40 metre operation is desired (perhaps with the exception of the G5BRV, etc., but 20-10 metre operation really requires something with a little more gain and directivity). By the same token, the 80 or 40 metre dipole which performs so well in its own right, leaves much to be desired on 20-10 metres.

The operator who likes to work all five bands must therefore have an antenna system for 80-40 metres and one or more for 20-10 metres, and be able to change quickly from one to the other without hunting for co-axial cables or unplugging or unscrewing various connectors. Sooner or later the connectors start to wear, contacts become dirty or fail to make firm electrical and mechanical connection, etc.

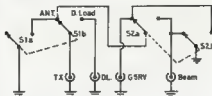
Having experienced these troubles, I decided to take steps to remedy the situation and make antenna changing as easy as band switching. After looking at currently available commercial coaxial switches, I discovered there were several drawbacks: (1) Price! (2) My requirements were not readily catered for in commercially made switches unless I bought several and interconnected them. (3) Placement of the connectors on the switch housing was inconvenient, requiring special mounting and/or a number of right angle connectors which add considerably to the cost.



My requirements were (a) to be able to switch the transceiver to a dummy load, for tune up without radiating a signal or for testing on full input while monitoring on a c.r.o., (b) to enable rapid change over from the G5RV used on 80 and 40 metres to the 3 element tribander for 20-10 metres. Often it is desirable to listen briefly on the lower bands to see what is happening and then revert to the higher bands. It becomes pretty tedious if plugs have to be changed to switch a dummy load or the change over to a dummy load. The change over tends to deter one from operating on bands requiring another antenna unless there is a definite sked or a station to be worked.

The end result was a cheap, simple and effective switch that was constructed in a matter of an hour or so and has proved to be a real winner in operating convenience and cost.

Let me make it quite clear that it is not meant to rival a commercial unit rated at 1 kW. to 500 Mc., but these stringent requirements are not what I am asking of it. Mine operates with a linear producing 400w. p.e.p. at 28 Mc. and is quite satisfactory. Cross talk is kept to a minimum and in the dummy load position, NO signal is audible in the receiver from either the G5RV or TH3.



The constructional details may be varied to suit individual requirements but all leads should be kept as short, direct and heavy as possible. The braided outer conductor of thin co-axial

is ideal. The actual switches used were Oak type two-pole, two-position, but since constructing my unit an article has appeared in "CQ" using slide switches in the same application. No doubt many types could be used, but a little experimentation may be required to find the most suitable.

Switching must only be carried out with the transmitter on stand-by. R.f. arcing may ruin the switch contacts (and the final tube) if these precautions are not observed.

The switches are housed in a metal box 5" x 3" x 2" with a metal cover on the back for shielding and this can also serve as a method of attaching it to a wall if a couple of screw holes are drilled in the back plate. The connectors used were SO239, but Belling-Lee types, etc., can also be used. For my own requirements, the connectors are mounted on the edge of the box, but again this depends on just where the switch will be placed, and the choice of position is left to the constructor, as also applies to the placing of the switches.

Improving the Signal-to-Noise Ratio of Receivers

(That incorporate the use of 6BE6 Mixers)

JIM JONES,+ VK2ZEZ/T (Ex-VK3ZEW)

Many of the cheaper Amateur receivers incorporate the use of a pentagrid mixer such as the 6BD6. This tube would be one of the noisiest modern tubes available today, having an equivalent noise resistance of 250K ohms.

The use of such a tube in an Amateur receiver, even with an r.f. amplifier, is the noisiest link in the whole receiver. The main argument for their use seems to be, you get a little more gain, but what is the use of this gain if the receiver noise is much higher anyway?

As the 6BE6 is a seven-pin miniature, this limited the number of tubes we could choose from, that also had a low noise figure. Finally, after looking in the junk box, we came up with the 6BE6.

The 6J8 has an equivalent noise resistance of 2000 ohms approx., which is a vast improvement on the 6BE6. This modification only requires the re-wiring of the 6BE6 socket and the replacing of a couple of components.

This circuit is very commonly used in most s.b. rigs, both transmitter and receiver, and is known as a product detector.

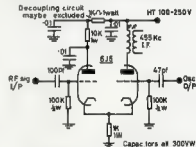
THEORY OF OPERATION

The r.f. signal is fed on to the first section grid of the mixer. This first section is only a cathode follower (which has a gain less than unity).

The main reason for incorporating this circuit is that both inputs to the

mixer are isolated, thereby cutting down spurious signals generated by the interaction of the two.

As the cathode is common to both sections, the r.f. signal is cathode injected into the second section. (Note the cathode must be unbypassed.)



The oscillator is coupled through a 47 pF. capacitor on to the second grid. The two signals are mixed and amplified together by this section. At the anode there are four frequencies—the two inputs, the sum and difference frequencies.

The i.f. transformer is in the anode circuit and selects the correct frequency and the others are bypassed.

The only disadvantage of the circuit is that there is a slight loss of gain, but the signal-to-noise ratio is vastly improved, so the loss can be overcome just by the fact that we can hear signals which (even with the extra gain) were down in receiver noise level.

* 7 Norman Ave., Frankston, Vic., 3199.

†1 White St., Durlington Point, N.S.W., 1904.

STATEMENT FROM REGION III. CONGRESS

Sydney, Australia, 15th April, 1968

At this inaugural meeting the following countries accepted an invitation to attend and were Japan, Philippines, New Zealand and Australia.

Support for this meeting and apologies were received from Nepal, India, South Korea, Laos, Thailand, United Kingdom and Hong Kong.

The President of the I.A.R.U., Robert Denniston, W0DX, was also present and was requested to be Chairman for the discussions.

It was resolved that an organisation be formed in Region III, and the following objectives were agreed to:—

AIMS

The aim of the organisation is to assist the officers and headquarters of the I.A.R.U. in their objectives. Specifically these are—

- (a) The promotion and co-ordination of two-way radio communications between Amateurs of Asia and Oceania.
- (b) To effect co-operative agreements between the National Amateur Radio Societies in Asia and Oceania.
- (c) The advancement of the radio art.
- (d) The representations of two-way Amateur Radio common interests in international communication conferences.
- (e) To promote such additional activities allied to Amateur Radio communications.

FURTHER OBJECTIVES

Further objectives, to deal with problems peculiar to this area, are—

- (a) To approach government officials in all countries in Region III to encourage them to improve their attitudes towards Amateur Radio and to ensure the retention of the Amateur frequency allocations.
- (b) The development of educational assistance programmes.
- (c) The introduction and establishment of Intruder Watch activities.
- (d) The establishment of essential emergency communications within in the respective countries.

ORGANISATION

It was resolved that there will be a board of directors, one from each society represented and appointed by that society. The President of the I.A.R.U. must be a director. The Wireless Institute of Australia is to provide a Secretariat and will be appointed by this Institute in consultation with the W.I.A. Director.

It was further resolved that monies will be contributed by the Societies of Japan, Australia, New Zealand and the Philippines in proportion to their resources, such monies to be applied to purposes approved by the directorate.

The meeting resolved that the Secretariat formulate draft rules to be circulated amongst Directors for discussion, and that subsequent opinions will be collated by the Secretariat and re-circulated to the Directors with a view to their adoption at the next Plenary.

It was resolved that Directors and Secretariat plan future Directors' meetings.

The meeting placed on record its gratitude for the offer of J.A.R.L. to hold the next Plenary meeting in Tokyo in 1971.

The visiting delegates expressed their great appreciation for the initiative of the Wireless Institute of Australia in convening the first Region III Congress and for its excellent facilities and gracious hospitality.

DELEGATES PRESENT

Representing I.A.R.U.:
President, Robert Denniston, W0DX, VK2EBB.

Representing Japan:
President J.A.R.L., Kenichi Kajii, JA1FO.
Foreign Liaison Director, Kiyoshi Mizoguchi, JA1BK.

Representing Philippines Amateur Radio Association:
M. Emilio Asistores, DU1EA.

Representing N.Z.A.R.T.:
President, Harry Burton, ZL2AFS.
Tom Clarkson, ZL2AC.

Representing W.I.A.:
Geo. Fisher, VK3VX.
David Rankin, VK3QV.
Peter Williams, VK3JZ.

CONTEST CALENDAR

- 11th/12th May: 17th OZ-CCA Contest (c.w. only).
- 11th/12th May: Sansester Shield—3.5 Mc. (N.Z.A.R.T.).
- 6th/7th July: New Zealand Memorial Contest (c.w. only) (N.Z.A.R.T.).
- 5th/6th October: VK-ZL-Oceania DX Contest, Phone Section.
- 12th/13th October: VK-ZL-Oceania DX Contest, C.w. Section.
- 12th/13th October: 21-29 Mc. Phone Contest (R.S.G.B.).
- 26th/27th October: "CQ" W.W. DX Contest, Phone Section.
- 26th/27th October: 7 Mc. Phone Contest (R.S.G.B.).

AWARDS

Korean DX'ers Society.—Now available is the Korean WAK Award. Requirements are as follows: Confirmed contacts with one HMI and one H1S station after Sept. 1960. Any band, any mode. Submit FADS and two LKs. Contacts after Jan. 1, 1967 QSLs need not be submitted. Send certified (by two officials). Log details and send to ONSA, Antwerp, OSA DX CW Club, Post Box 331, Antwerp.

Benelux Award.—The OSA, Antwerp CW DX Club issues this award to any Amateur for confirmed contacts with Belgian, Luxembourg Amateurs as follows: DX applicants need four OKs, four FADS and two LKs. S.W.I. need seven OKs, seven FADS and two LKs. Contacts after Jan. 1, 1967 QSLs need not be submitted. Send certified (by two officials). Log details and send to ONSA, Antwerp, OSA DX CW Club, Post Box 331, Antwerp.

- VK1WB—W. B. R. Brooks, Cottage 84, H.M.A.S. Harman, Canberra, 2600.
- VK2BCB—G. A. Butler, Station; Lot 185, Broadview Ave., Cullburra; Postal: 21 Hall Rd., Hornsby, 2077.
- VK2BEM—E. M. McDonald, Station: 340 Werulda St., Moree, 2400; Postal: P.O. Box 209, Moree, 2400.
- VK2BIT—J. N. Thomas, 18 Alton Ave., Strathfield North, 2135.
- VK2BMT—M. R. Travens, 63 Coveney St., Bentley North, 2207.
- VK2BPM—P. A. McGraith, 29 Wright Rd., Drummoyle, 2247.
- VK2BSH—W. S. Ringrose, R.R.M. 175 Cliff Rd., Forster, 2422.
- VK2EZH—R. T. O'Connor, 384 Victoria Rd., Ryde, 2112.
- VK2EZH—H. P. Robinson, 29 Orchard Rd., Etna, 2251.
- VK2OZ—H. Schroder, 39 Rangers Ave., Mosman, 2088.
- VK2ZSV—R. Soule, 1/120 Mount St., Coogee, 2034.
- VK3AHV—F. E. T. Weaver, 45 St John's Ave., Camberwell, 3184.
- VK3API—Technicians Training School Branch, A.P.I. Division, 453 Auburn Rd., Hawthorn East, 3123.
- VK3AUV—S. A. Sibily, 17 Luck St., Eltham, 3085.
- VK3AYT—T. A. Rowan, 34 Elstone Ave., Midridge, 3042.
- VK3AZT—P. Addis, 100 Mathoura Rd., Toorak, 3142.
- VK3ZCN—B. F. Jones, 309 Chesham St., Balclutha, 3200.
- VK3ZHX—H. Jones, 3/103 Dandenong Rd., Murrumbidgee, 3185.
- VK3ZJW—N. D. White, 59 Charles St., Ascot Vale, 3032.
- VK3ZKK—D. Scragg, 26 Cheam St., Dandenong, 3175.
- VK3ZYK—G. H. Garspar, 22 Hudson St., Caulfield North, 3101.
- VK3ZYK—K. G. Malcolm, 40 Sankey St., North Clayton, 3165.
- VK3ZYN—D. Appleton, 34 Deskia St., East Bentleigh, 3186.
- VK3ZK—A. E. Humphreys, 80 Romely Dr., Nunawading, 3131.
- VK4GU—J. G. Kuehberg, 30 McDowall St., Toowoomba, 4350.
- VK4LO—J. L. Murray, 9 McIlwraith Ave., Balmoral Heights, 4171.
- VK4DT—J. Raymond, 43 Blencowne St., Kissambath Grove, 5115.
- VK4FS—H. D. Spence, 218 Bromes St., North Cottesloe, 5011.
- VK4HB—H. G. Buckley, 385 Fitzgerald St., North Perth, 6006.
- VK4JL—A. J. Pearce, Flat 208, 181 Mounts Bay Rd., Perth, 6000.
- VK4KC—K. C. Williams, C/o Pearl Pty. Ltd., Kuraby Station, Kuraby, 6725.
- VK4ZDG—B. Nosseda (Rev. Fr.), Kalumburu Mission, via Wyndham, 8746.
- VK4TZQ—J. E. Gelson, 144 King St., Westbury, 7533.
- VK4QC—R. H. Mould, 47 Third St., Boroko, Port Moresby, P.N.
- VK4KA—J. Debel, Station: Kurimum St. Lee, N.G.; Postal: C/o, Pioneer Surveys, P.O. Box 897, Law, N.G.
- VK4KC—Hayes, C/o D.C.A., Cocos (Keeling) Islands, P.N.
- VK48N—J. B. Bell, Station: Hombrum Bluff, via Port Moresby, P.; Postal: P.O. Box 304, Port Moresby, P.

CANCELLATIONS

- VK1JT—J. P. Talbot (Mrs.). Not renewed.
- VK1FA—J. W. Talbot. Not renewed.
- VK1ZAW—W. B. R. Brooks. Now VK1WB.
- VK2EM—E. J. Mulholland. Transferred Interstate.
- VK2QA—N. T. Durham. Not renewed.
- VK2AUP—F. D. Power. Not renewed.
- VK2ZT—Technicians' Training School Branch, A.P.I. Division. Now VK3API.
- VK48Y—J. J. Potter. Deceased.
- VK4LY—L. A. Daney. Transferred Western Australia.
- VK4VU—J. J. Dexter. Transferred Victoria.
- VK4ZBL—J. L. Murray. Now VK4LO.
- VK4BWD—B. C. W. Smith. Ceased operation.
- VK45K—M. E. Petersen. Ceased operation.
- VK4DE—H. G. Austin. Ceased operation.
- VK47M—R. H. Mould. Now VK3QC.
- VK48H—H. H. Hurness. Left country.
- VK48V—J. B. Bell. Ceased operation.
- VK48H—H. G. Buckley. Now VK4HB.
- VK48N—H. D. Spence. Now VK4FS.
- VK4ZCF—J. B. Chatter. Transferred to Western Australia.

PROJECT AUSTRALIS HI-BAL.

AN INTERIM REPORT ON THE AUSTRALIS II. PROJECT

BY LES JENKINS, VK3ZBJ

At 0605 E.A.S.T. on Thursday, 28th March, under ideal weather conditions, Hi-Bal flight 361 rose smoothly from its launcher at Mildura Airport. Tracked away inside the 500 lb. payload was the first experimental package of the "Australis II" project, having a total all-up weight of 15 lbs. In Melbourne, 310 miles to the South-East, in Adelaide, 300 miles to the West, at Sydney, 580 miles to the East, Amateurs listened to the net frequency of 7.1 Mc. for news of the event.

At Mildura, Noel VK3AGF talked with the team at the launch site on 146 Mc. At the same time his signal was being relayed via the airborne package on 432.150 Mc. The first Australian Amateur balloon borne repeater was in flight and working.

The balloon rose slowly above the airport, ascending at about 800 feet per minute. It would be at least an hour before it reached sufficient height to be received by any of the stations listening anxiously at a dozen locations in three States.

At 0700 hours contact was established between VK3AGF and Ken VK3AKK at Springvale, 15 miles South-East of Melbourne on 40 metres. News of the successful launch was passed to Ken, who was maintaining a constant watch on 43.15 Mc. During the contact, at 0710 hours the pen recorder attached to the receiver slowly started to rise. Ken began an immediate transmission on 146 Mc. At Mildura his signal was heard on 432.150 Mc. Contact with Melbourne had been established.

For the next half hour, as the balloon continued to rise (and operators likewise), more and more stations were heard calling and working via the prototype of what will be Australia's first Amateur communications satellite.

The next four hours saw the balloon reach its full height of 103,000 feet (approx 30 miles) and during the flight contacts were made between Melbourne, Adelaide and Mildura. Signals were also received at Woomera and although faint best notes were heard in Sydney, no contact was established. Signal strengths of S9 and over were reported by many stations and good readability was maintained throughout the flight, in spite of interference created by some of the equipment belonging to the main experiment carried on the balloon.

Some of you may be wondering what this is all about and perhaps know nothing of the "Australis II" project. "Australis I" has been covered by this magazine before, and is scheduled for launch later this year. This will be followed by a second satellite, which, it is hoped, will be a high altitude semi synchronous orbiting linear translator. Exact details of input and output frequencies have not yet been decided, so we are using the balloon-borne flights to gather data on the performance of various systems in an effort to ensure that the right one goes into orbit.

EQUIPMENT USED

The system which was used in the flight described is as follows. Signals transmitted by ground stations on 146,000 Mc. f.m. are received by the repeater using a high grade, but otherwise conventional f.m. receiver. The signal is de-modulated and passed on to an exciter which generates a phase modulated signal at 13,500 Mc. This is then frequency multiplied to 108.5 Mc. and raised to a power level of 8 watts. This power is then applied to a Varactor quadrupler and thence to the transmitting antenna. Power output is 3 watts.

The receiving antenna used was an inverted ground plane of conventional design, whilst the transmitting antenna was a turnstile, horizontally polarised.

Power for the package was provided by alkaline re-chargeable cells normally carried by the balloon. The supply voltage was 13.5 volts and the total current drain 750 mA.

It is hoped that many more flights of this nature will take place during the next few months, so keep an ear to receivers on 7.100 Mc. on Monday evenings at 2005 hours E.A.S.T. and also on 148.00 Mc. f.m. for details.

Finally, I would like to take this opportunity to express my thanks to all those who helped to make the first flight so successful. This is particularly so of the launch crew at Mildura, led by Eric Curwood, of the Dept. of Supply. Also, the venture would not be possible without the co-operation of the American Atomic Energy Commission, by whose courtesy space on the flight is made available.

I would like also to thank all the Amateurs who participated in the experiment, particularly Ken VK3AKK, who made continuous tape and chart recordings of the entire flight, also Noel VK3AGF who placed his station at our disposal for liaison purposes during our stay at Mildura.

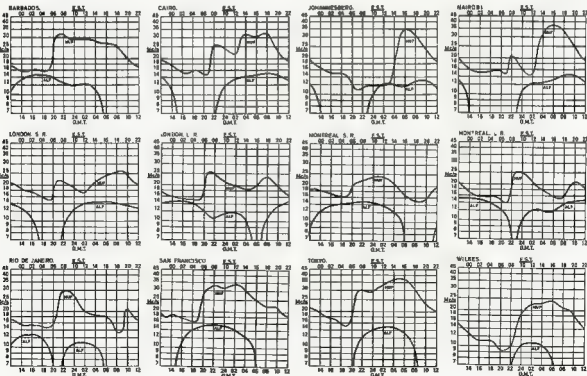
There are two people left whose names have not yet been mentioned. They are Ralph VK2ZRG and Cliff VK2ZLW. The package which was flown was designed and built by them at Sydney, and is the result of nearly a year's work. Congratulations to both on a remarkably fine effort.

This report would not be complete without a list of the stations who worked through the repeater. This list may be incomplete due to lack of information, so we would appreciate any reports in this regard: VK1 AKK, RAGP, 3ZFW, 3ZXR, 3ZDZ, 3ZMW, 3ZDZ, 3ZQJ, 3ZFI, 3ZBJ/Mobile Mildura, also 3QX at Woomera and 6TN Adelaide.

The crew at the launch consisted of Richard Tomkins of the Melbourne University Astronomical Society, and myself, Les Jenkins, VK3ZBJ.

PREDICTION CHARTS FOR MAY 1968

(Prediction Charts by courtesy of Ionospheric Prediction Service)



1967-68 ROSS HULL MEMORIAL CONTEST RESULTS

TROPHY WINNER

VK3ZER—R. W. WILKINSON

RESULTS TABLE

(Award winners given in bold type)

Call Sign	T-Day Score	Sec- tion	No. of Contacts per Band (Mo.)			48-Hr. Score
VK1VF 1ZCG	481 320	B	49 61	10		216 105
VK5ZCF 2ZFB 2ASZ	888 922 277	B	85 164 66	169 12 22	14 7	357 28 134
VK3ZER 3JOS 3ZCZ 3ZCV 3ARM 3ZYT 3AZG 3AUN	2158 1185 1137 704 866 659 395 113	B	5 22 120 17 61 77 7	101 31 125 18 48 77 2	25 11	794 472 459 243 214 278 200 53 122
VK4ZMG 4ZFR	936 552	B	147 69			399 146
VK4ZIM 4ZZE/3	546 130	B	84 27			296 40
VK5HP 5ZKR 5ZMW 5ZEJ 5TN	1864 1474 718 329 67	B	34 50 87 29 10	105 40 16 17 10	9 9	610 585 279 122 46
VK6ZAS 6ZAA 6ZFY	607 393 321	B	178 105 80	28 21 22		205 135 78
VK7DK 7ZAH 7CWA 7ZKJ	974 634 71 30	A	17 52 31 10	72 22		458 167 37 78
VK8ZMP	14	B	4			1

Listener's Section:

VKL-15098 452

EXCERPTS FROM COMMEM
RECEIVED WITH LOGS

"Enjoyed another Ross Hull Contest; very happy with the Rules and point scoring, but completely disgusted with the poor conditions experienced over 3 metres over the Contest period. Very Zealand stations were almost non-existent and no 2 metre openings. It takes all the fun out of it when one has to sit by a dead band for hours or days to be rewarded with a 16-minute opening to the next State only." - VK3ASZ

"In general the Contest does do a lot to stimulate interest of the v.h.f./u.h.f. bands. It should be retained if at all possible even if the actual number of logs submitted is rather low. I do not think the number of logs returned reflect the true interest in the Contest. I found operation very enjoyable and did not find any reluctance on the part of other Amateurs to exchange numbers.

"I feel that log requirements are one of the keys to greater interest in the Contest. There is quite a lot of work in submitting a log and anything not essential should be dropped. The 'Emission/Power' column has nothing to do with scoring whatever, so why have it? Perhaps an inclusion on the summary sheet would be sufficient.

With regard to distance, I feel that the distance in miles should not have to be stated unless it is more or less on the border-line. For instance, a 6 metre contact is worth 8 points, 501 to 1050 miles; if a station is worked between, say, 550 and 950 miles, what point is made by quoting the mileage?

The scoring table seems to be okay apart from some minor changes on 4 and 6 metres and I feel that the scoring on 2 and 8 metres should be the same up to 300 miles.

"The exchange of numbers for local contacts and a one point score, while not helping much in the Contest, do seem to stimulate interest and for that reason should be retained."—
VMM:VJ.

"I wish to make one complaint re the rules of this last Rose Hull Contest, and is also those feelings of my fellow Amateurs here in the Eastern Zone, also the VK3 and VK4 (southern) zone. The contest was well run, but on the other hand was open, especially from VK3 to VK4 and VK4 to VK3, and neither the VK4 nor VK3 could come on because of TV CA's so as such, I recommend future Contests, either in the VK3 or VK4 zone, not being open between them in their scoring tables. "3."-VK3KZQ

"Rules okay, but would like 50-100 miles over 5 meters to be worth 3 points. It is a much more difficult band than 7 meters, and it worth 5 times that band.-VK6R-TV."

"Filling out of logs is a bit tedious--why not leave out power as it does not have any bearing on results. Points for local contacts should be retained, because while you are talking to

"Suggest some recognition for station in each State with the most contacts.

"How do you make a JA understand you want a number for a contest?"—VKKIAHM.

"I have participated in the Ross Hull Contest since 1961 and would not like to see it abolished for any reason. I have not entered a log for the past few years owing to poor conditions on the v.h.f. bands in which I operate and hence a very low score. The 48-hour division is a good scheme and to confirm my interest in the Contest I am submitting a log for this section. The rules and scoring table are F.R."—VIRADUN.

"(1) Would like to see the duration consist of either 7 or 9 days, but to be consecutive days of operation. This would ensure more sustained activity during the peak period of the Contest. As one can now simply pick and choose, there is nothing to hold one to the true spirit of the Contest.

the spirit of the Contest will be in the overall interest of the Contest for an award to be made for the highest scorer in each call area covering the full period of the Contest, in addition to the 7-day period. This would give the die-hards who claim the shorter period has spoiled the Contest to still give it a go if they have the time, which they apparently have, while allowing the shorter period scorers to go forward to the next year or simply to score 11 months or a month or so.

(13) The scoring table still contains anomalies I feel. As I suggested in earlier correspondence, the table would be ideal or close to it if the scoring for 83 Mc for 81 to 100 miles was raised to the same as 144 Mc., namely 5, and the 101 to 200 scoring for 82 Mc. raised to 10, in line with 144 Mc. Otherwise, the table seems about

"(4) Fully agree with E.A.T. for an Australian Contest.

"(5) Would not like to see Contest discontinued, despite what entries may be received this year. The band conditions were so consistently poor for the average contestant that only those favourably situated, e.g. in Victoria or South Eastern S.A., are likely to have consistent scoring, as they are within 144 and 432 Mc range continuously, whatever the day or conditions. The rest must depend upon 25 Mc openings for consistent logging, and this was not possible this year on a per approach anything like some previous years.

"(6) I feel the Contest Committee at present handling affairs is doing a very good job, and

"Rules will never let W.A. entrant win Australian trophy due to lack of 144 and 428 Mc. activity in W.A. country areas, especially compared with Eastern States!"

"Ross Null Trophy should revert to 53 Mc. band only as it used to be and/or other trophies established for 144 Mc. band; and for 433 Mc. and for 575 Mc. and up."—VK2ZAA.

"Conditions again very poor—my personal score would have been far better had the Contest started three weeks to a month earlier. As it was I was 'on the band' on each occasion it was open. Two metre activity in south-east VET is almost nil."—VETNET

"Well, another Ross Hall Contest is over and my scores are going from bad to worse—

not for the want of trying. I would like to make some comments about two aspects of the Contest: (1) Reading and (2) Conditions.

"(1) With respect to the scoring method at present being used, I see little benefit in such a method. I would like to point out the fact that 'if a max opens it's open and if a min

does not open, it isn't and nothing we can do will alter the propagation. The same I am sure goes for 144 Mc. Possibly the scoring method at present in use is good for frequencies above 144 Mc. I think a better method for 8 and 3 mhz would be, say, 1 point local contact, 3 points DX plus multipliers for States worked—10 for first contact in a State, 5 for second, and 3 for 3rd contact in each State. I hope my suggestion is taken as constructive criticism because I am very much in favour of the Contest.

"(2) Those conditions all I can say is 'what has happened to this sunspot cycle?' Do you think you could obtain the figures for the sunspot activity during the Contest period and publish these for information with the Contest results. Possibly with comparative figures. I might add that the best period for DX in this location, Darwin, is during the 'dry season' or the southern winter. Last 'winter' I was able to work over 800 J/As, K1R2As, K8R2As but during the summer or our 'wet season' there appears to be very little from this location.

"I did, however, monitor Channel 9 in Melbourne and Brisbane on numerous occasions and three times New Zealand television. I hope I have not bored you with this information."

The Federal Contest Committee, in presenting this year's results, have set out the table below to show how activity varied from State to State and how the bands compared with each other. Readers may draw their own conclusions, but from analysis of 1967/68 logs compared to 1965/6, there was a very definite move to 144 Mc, and higher for scoring, while the overall total scores were much lower. The almost non-appearance of 2L stations and the still elusive JA and Oceania contacts possibly attributed to the reduced activity and

If those operators who have not entered the Contest gave one day to working in the Contest and submitted a log, the results could be very useful to the Committee and may provide a certain impetus to the Contest in general. How about it for next year?

To VK3ZL go our congratulations for a fine effort, and to his XYL for the part in powering his log.

See you all again next year.

PAST WINNERS

The first Ross A. Hull Memorial Trophy V.h.f. Contest was held in the summer of 1960-61. The winners since then have been recorded on shields mounted on the base of the trophy. The winners to date are as follows:

1980/81	R. V. Gaile, VKQR
1981/82	H. Lloyd, VKBCB
1982/83	A. K. Bradford, VKAKK
1983/84	R. J. Everingham, VKBSO
1984/85	R. Wood, VKJAO
1985/86	G. M. McCulloch, VKKGM
1986/87	I. F. Berwick, VKJAL
1987/88	I. F. Berwick, VKJAL
1988/89	D. F. Morgan, VKZAX
1989/90	W. Roper, VKJAE
1990/91	M. J. McMahon, VKZDR
1991/92	D. Morgan, VKJAX
1992/93	M. J. McMahon, VKZDR
1993/94	R. W. Wilkinson, VKZKR
1994/95	J. R. Beamer, VKZDM
1995/96	J. R. Beamer, VKZDM
1996/97	R. Wilkinson, VKZKR

Thus it can be seen that stations in VK1 have won 8 times, VK5 5 times, VK4 4 times, and VK2 one. Nobody in VK3 or VK7 has ever won the trophy which is surprising since the Eastern States are supposedly "hot beds" of v.h.f. activity.

—D. H. Rankin, VK3QV,
Federal Activities Officer

LATE ENTRIES FOR VK-ZL-OCEANIA CONTEST 1987

LAIHC	OKDB	OKIALG
SMEDG	OKIABU	OKIAAW
OKIMB	OKIAHZ	OKJ-1998/1
OKKCC	SEPAJK	UAKJBO
OKIBO	SEPAIB	UAKJZZ
OKARZ	OKIAIH	UAKJL
OKIADM	OKIAFO	UAKKAE
OKIBW	OKIBTP	UBKCKA
OKSQX	OKIAFN	WCKBT
	OKICJ	

Wireless Institute of Australia Federal President's Report

MARCH 1967-APRIL 1968

Gentlemen, it is again my pleasure to present an Annual Report to the Federal Council on the occasion of the 32nd Federal Convention being held this year in Sydney.

Firstly I would like to record my thanks to the members you appointed to the Executive for the year 1967-68 for the thoroughness and efficiency with which the duties of the Federal Executive has been carried out. In particular, I extend to Federal Secretary, John Batrick, VK3CJ, my sincere appreciation for the tremendous effort he has personally exerted in handling local and overseas correspondence, news bulletins to the Federal Council, and in "Amateur Radio" magazines, for making available to me copies of outward correspondence and other pertinent information in order that I be kept in touch with Executive affairs, and for his expertise in co-ordinating the work of all other members of the Executive. In addition to all this, he has found time with other members of the Executive to maintain the schedules on the air with Federal Councilors and on the South East Asia net where excellent liaison has been carried on with Region III Affairs. With much of this work he has been assisted by Assistant Federal Secretary, Peter Williams, VK3EZ, who will be taking over the duties of Federal Secretary for the next twelve months.

The experimental period I mentioned last year has been a period of great activity and of the Headquarters Division has proved most successful. The additional drain on Federal Council funds has been most noticeable, but having a much greater volume of work done in a shorter period of time than was hitherto possible, the Executive will agree that the amount of information received is proof of the success of this move.

The production of the Hebert Convention minutes a record of 84 pages was again a combined effort of four Executive members and the completed document is in the hands of the Federal Council. The production of the minutes to record my thanks to Geoff D'Emden, VK1ZAS, who, despite technical problems with one of the recorders which remained on the bench for the remainder of the Convention, was able to re-record from an overall "master" tape which had most fortunately been made by Geoff D'Emden, a simultaneously recording the entire proceedings at 1 1/2 inch per second.

HANDBOOK

The final printing of the Handbook for Operators of Radio Stations in the Amateur Service was protracted for reasons beyond the Institute's control. However, as you are all now aware, it is available from bookstalls and advance copies were forwarded to Federal Councilors by Federal Secretary John Batrick. The delay in the printing of the Handbook was granted to advise Amateurs on much of the context and the information that is contained in the Handbook. President, Harold Hepburn, VK3AFQ, and printed in various issues of "Amateur Radio".

The publication of the Handbook was the completion of a long standing project. My compliments are extended to all those who spent so many hours working in liaison with the Institute Secretariat for the editing, printing and for having been successful in clearing up the anomalies and ambiguities which existed in the earlier edition. The co-operation extended by the W.I.A. by the Federal Secretariat Department has been very much appreciated and I am certain that the extent of the new Handbook will be well received by all those who as the Australian Amateur in making for clearer application of the Regulations under which we operate.

DIRECUTS WATCH

The Intruder Watch Committee composed of Peter Williams, VK3EZ, VK3CJ, and Assistant Federal Secretary, Peter Williams, VK3EZ, Dr. David Wardlaw, VK3ADW, and myself (VK3EZ) held several meetings following on the Convention. Federal Secretary John Batrick circulated information on the progress of the project from time to time in Federal Councilors' Division.

Information on the systems used by the A.R.L. and the A.S.G.B. were obtained and discussed by the Committee in detail. A report on the systems to be used was decided upon subject to confirmation on the particular one based—"From the W.I.A. to the P.M.G.'s Department". This was to be discussed with Mr.

Charlie Carroll of the Radio Branch, following the Christmas holidays, but due to the serious illness of Mrs. Carroll this has not been possible. As soon as Mr. Carroll is available, a long service leave to look after his wife and as at the time of writing I have to advise that Mrs. Carroll passed away. The Executive sent cards and flowers as an expression of sympathy on behalf of the Federal Council.

The final stages of this project will be taken up as soon as Mr. Carroll is available. In the meantime I trust Divisions are looking for candidates prepared to offer a few hours of service each week as Executive Watch Officers, and that one qualified Amateur is being appointed as Divisional Intruder Watch Officer.

I wrote an article in the October 1967 issue of "Amateur Radio" giving details of the system we proposed using and calling on Amateurs to offer assistance in protecting their own bands. This system was approved by John Batrick on the Federal Comment page in the November issue, but to date there has been limited response.

The project is now in the hands of Dr. David Wardlaw, VK3ADW, and you will be receiving further information from him later on this year. The project is being kept under review in support of action already taken in Regions I and II, so I trust you will do all possible to obtain the services of members of your Division.

CONTESTS

The Contests in general were again well supported over the past twelve months, the results of which have been printed in "Amateur Radio" magazine. On behalf of the Executive, I wish to record our appreciation of the able team work carried out by the Federal Contest Committee under the management of Neil Penfold, VK3DZD, who will be attending the Convention as the newly appointed Federal Councilor for the VK3 Division. It is also gratifying to know that the VK3 Division is again prepared to provide the personnel for the Federal Contest Committee for the next three years. Federal Activities Officer, David Rankin, VK3GJY, will be attending the Convention as a liaison officer in assisting the smooth operation of the Federal Contest Committee.

The Remembrance Day Contest—always a most popular event—was opened on 12th August, 1967, with an illuminating recorded address by the Hon. Allen Fairbairn, M.L.R., Minister for Defence. The contest was well supported. It would be obvious that such an excellent address would not have been prepared in five minutes, yet—typical of Allen Fairbairn—was prepared at short notice at a time when he was confronted with a hectic week of pre-budget work as Minister for Defence. I record here the appreciation of the Wireless Institute of Australia for a very fine address and the time devoted to doing it.

At this point I must also record my appreciation to the Executive and the various Branches of the W.I.A. in making the arrangements for the recording, particularly to Jim Cowan, VK3EKG, from the engineering staff of broadcasting station 3KO who made the actual recording and copies; to the announcer and other members of the staff who assisted; and to Ken Hume, VK3HJ, who made the final arrangements and despatch of the tapes to the W.I.A. Divisions. Congratulations go to VK3 for winning the R.D. Contest for 1967.

FEDERAL AWARDS

It was with deep regret that we recorded the passing of the Federal Awards Manager, Al Kluge, VK3HJ, who, due to pressure of work, was a well-respected and well-known DX operator who, despite declining health over a number of years, devoted a great deal of time to the work of recording and mailing certificates to applicants for awards and generally dealing with all matters pertaining thereto.

His successor, VK3AHQ, close friend of Al's, immediately took over the records and until February this year carried on the office of Awards Manager. Due to pressure of work in other directions, he has found it necessary to retire and the office has been taken over by Geoff Wilson, VK3JAK, an Amateur with considerable experience in DX operations. I can assure Federal Council that this part of Institute affairs is in most capable hands.

From an inspection of the awards records I find there has been a satisfactory "lift" in the number of applications for awards generally, particularly the WA-VK-CA Award

(Worked All VK Call Areas Award) which serves as a silent ambassador for VK abroad. I believe the certificate issued in respect of claims for this award is held in high regard by overseas Amateurs who have received it.

FEDERAL QSL BUREAU

Last year we said "goodbye" to Ray Jones VK3RJ, who had notified Executive of his resignation after 34 years' service as Federal QSL Officer.

However, I am glad to say that Ray must have found solutions to his problems and agreed to carry on. Some of the work load has been taken off his shoulders by a change in the operation of the Bureau and we are indeed happy to have him back on the job. His usual report will be added later on in the proceedings of this Convention.

PUBLICATIONS COMMITTEE

Again the Publications Committee has worked hard and quickly in the background to maintain publication of "Amateur Radio" and the "Australian Radio Amateur Call Book".

A sizeable amount of space was granted to Executive during the past twelve months for the purposes of bringing a certain class of information to members. I believe this has been a good thing and I would like to express my understanding by members of what is going on in the Amateur Service and the Institute generally.

In addition to this class of content, a steady flow of technical articles has appeared and the general high standard of the magazine has been maintained. Another up-to-date issue of the Call Book has been printed, utilising the same highly praised format of the 1966-67 edition.

A report and balance sheet will be tabled during the Convention along with other reports.

MEMBERSHIP

In mentioning membership I have belaboured the point in the last few years that the finance required to maintain the Institute's activities and to extend them into the field, is entirely dependent on under-developed nations where little or no Amateur Radio exists—and this is something I believe we must do to protect the future of our technical hobby—only by available by expanding membership or raising fees. But since raising fees would only partly solve the problem and would have something we could expect to go on raising, then expanded membership is the real solution at this stage. The figures I have available of licensed Amateurs in VK, compared with last year, are as follows:

	1966-67	1967-68	Full Limited Total
Current increase	142	108	250

From these figures you will note a total increase of licenses for the year of 318, of which 188 successfully completed the A.O.I.C. and 143 the A.O.C.P. This marginal increase in the percentage of Limited to Full licenses was pointed out to Federal Council some years ago and suggested various measures for encouraging Limited licensees to sit for the Full license. Some Divisions, I believe, did take steps to encourage members to sit for Limited licenses, and I can only reiterate that some importance should be attached to this matter by all Divisions.

Excluded from the membership returns at hand, the following figures indicate the strength within the Divisions:

	VK3	VK3	VK3
Month ending	Dec. 67	Feb. 68	Oct. 67
Life	14	14	14
Full	880	834	344
Associate	442	380	128
Others	12	—	30
	1396	1248	496
Previous Totals	1287	1038	678

	VK3	VK3	VK3
Month ending	Feb. 68	Jan. 68	Feb. 68
Life	14	14	14
Full	880	837	163
Associate	442	371	128
Others	12	—	—
	1396	1214	292
Previous Totals	1328	1118	588

From these figures—compiled as at the dates indicated on the table above—the total membership of the W.I.A. stands at 11,000. The 1971 are full members. This full membership represents close to 51.5% of the total number of licensed Amateurs in the Australian Commonwealth and Territories—down from 21,400 in 1966, a 0.5% decrease over the period 1967-68.

This is, of course, not a significant loss, and in the final analysis, it is a small price to pay as a whole, continues to attract around half of the licensed Amateurs as it has continued to do now for a number of years.

As I have done in other years—the organization of this Institute has the potential to encourage all those who believe—and I believe it is true too—that the W.I.A. is solely responsible for the privileges enjoyed by Amateur operators in this country, who, perhaps, might expect to gain a 100% licensee membership. I strongly suggest that our public relations effort needs upgrading to bring about a better than 51.5% membership.

As I also said last year—without a growing membership the Institute will meet with difficulties in the future. Entering into fields of operation such as those envisaged in the Asian area will eventually impose severe demands on the Institute's resources. If plans are ultimately carried out as presently proposed, a matter which will receive the attention of Federal Councilors and of this Executive Committee.

There are, of course, other ways and means to raise finance, some of which I advocated last year. I am sure that the Institute will rather nebulous interest and have fallen into obscurity. I therefore find a membership drive still the only logical course open to the Institute to continue to exist and for the continued activity by Divisions.

Federal finance, however, is in a satisfactory condition. I have been advised by the Federal Treasurer, Kevin Connolly, VK4IAJ, having leave of absence last year in view of having to do an extensive tour overseas for the State Representative of Victoria, that he will be employed. During his absence Tom Cutbush, VK2LQ, carried on as Federal Treasurer and the Institute has received no contribution for the valuable assistance rendered by Tom during this period. Federal finance to today quite a complicated procedure and requires a person with a keen eye for detail. Tom applied himself with zeal and ability despite having limited time to spare.

Kevin Connolly, VK4IAJ, has been and has taken up duty on the Executive again, but due to pressure of work is unable to remain as Treasurer and has filed his resignation. He has been offered the position of Treasurer. A person willing to take over the office has not yet been found but Federal Councilors will be notified once the matter is settled.

A full statement of the assets and liabilities of the Executive, together with an audited balance sheet, will be tabled for Federal Councilors' approval during the Convention proceedings and will appear in the minutes as an annexure. My appreciation is extended to Kevin for a job well done whilst in office and it is regretted he is unable to carry on as Treasurer although he is prepared to remain as a member of the Federal Executive.

Review of the membership badge design. It shows that 46 members have been made Honorary Life Members of the Institute. Last year in the Federal Council meeting, I suggested that the current membership badge design produced in green and gold to distinguish the Honorary Life Membership badge proposed under Item 11 of the 1970 Convention. The Honorary Associate membership badges. These have now been struck and are available for distribution. At the suggestion of the Federal Councilors—mainly for historical purposes—to list in this report the names of those Amateurs who have had this distinction bestowed on them by their Division. I have been asked by the Federal Councilors to list the names of those Amateurs who were asked by the Federal Secretary for a list of the names and call signs of members who received the badge of Honorary Life Membership only those from the VKX Division have been notified to me. I am therefore, unfortunately, unable to name the honouree members, but shall be glad to add the names of those who were notified during this Easter period. May I, therefore, record here on behalf of the Federal Councilors my congratulations to those Amateurs who by virtue of having received Honorary Life Membership have, inter alia, made significant contributions to the Wireless Institute of Australia for the past 25 years.

It is with sorrow that "Amateur Radio" has lost the services of the informed and well known Amateurs over the last year, and sympathy is extended to relatives and friends of our members who passed beyond the veil. Many of them have been members of the members of the W.I.A. The Institute is the poorer

at the passing of these Amateurs who gave their time in assisting its growth.

W.I.C.E.N.

The Wireless Institute Civil Emergency Network has continued to be active during the year.

In N.S.W. W.I.C.E.N. exercises were held in conjunction with the Civil Defence Authority and in this regard Federal Executive played a most important part in assisting the establishment of acceptable lines of communication between the N.S.W. (VKE) W.I.C.E.N. Group, the N.S.W. Civil Defence Authority, and the Postmaster General's Department in order to legitimate these exercises.

In Victoria the system continued to operate as previously established. Many hours of work during the winter months resulted in the two W.I.C.E.N. vehicles reaching the operational stage, and one of these saw "active service" to the field at Myhrd during January, 1969, in a two-day operation in which 48 operators were engaged. The network was also called on "stand-by" during the recent Dandenong fires but on this occasion did not operate as the normal communication facilities were not interrupted and proved adequate to handle the various involved.

Victorian W.I.C.E.N. State Co-ordinator, John Bettrick, VK3OR, was a member of the Directing Staff during a communication exercise at the Rural Fire Brigades Association's Country Fire Authority (C.F.A.) held during the winter period.

During October, hearing news was received from the Tasmanian Division following on the problems the Institute and other service clubs during the devastating Tasmanian bush fires. Subsequent to a visit by Tasmanian Civil Secretary, Mr. Brian Miller, to South Australia to study the E.F.S. system there, Federal Councilors were called on by the Secretary of the Department. As a result of this visit the Tasmanian Division representative was invited to attend a meeting, the result of which was that the VKX Division has been fully accepted into the disaster plans of that State. I know that Federal Council will be pleased to hear that the first group of the Tasmanian Amateurs who participated in the Tasmanian emergency, one of whom lost his life and many others their private property, has properly been recognized. W.I.C.E.N. can look forward to an active future in Tasmania when emergencies occur.

In general, the Executive does not receive a great deal of news of the activities of the W.I.C.E.N. activities of the W.I.A. Divisions and I comment here for what it is worth that Federal Councilors should be kept advised of the activities of a Federal W.I.C.E.N. Co-ordinator so that up-to-date information is received from and dispatched to each Division and a proper file maintained on W.I.C.E.N. activities.

YOUTH RADIO SCHEME

The Youth Radio Scheme has continued to function throughout the Division and we have it gaining some momentum in the smaller Divisions. I do not propose to dwell on this subject since it will receive quite a wide attention during the debate on General Business concerning Y.R.S. during this Convention.

I would like to say, however, that there seems to have been some misunderstanding of the meaning of the term "Federal Y.R.S. Co-ordinator" inasmuch as a section of Federal Council have been under the impression that Keith Cutbush, VK2LQ, had agreed to hold the office over the past twelve months. It is true to say that the Executive did write and ask Keith to take over this position in the absence of a less likely but agreed-upon location, quite clearly that, whilst appreciating the honor of being asked, the offer was declined.

JAMMERS-IN-THE-AIR

The 18th Jambooree-on-the-Air, held over the week-end, 24th and 25th August, 1967, was again a great success and my appreciation, on behalf of the Executive, to the 200+ licensed and unlicensed Amateurs who participated in this event for the World Scout organization and opened their doors to Scout groups to visit and operate on the air.

The Jambooree on this occasion coincided with the XII World Jambooree in Idaho, U.S.A., and also with the 20th anniversary of the 1st experimental Scout camp which was held on Brownsea Island, England, in 1897.

RECENT INFORMATION

I am happy to report that as a result of our representations last year, a good deal of historical material has been gathered together by Federal Historian, George Glover, VK3AG, who has again put a great amount of time into extracting relevant information. His report will be presented to Federal Council later in the proceedings.

OVERSEAS MAGAZINES

The handling of subscriptions to "QST", "73" and other overseas magazines has been most satisfactorily handled by George Glover, VK3AG, on behalf of the Executive. The increment from the small margin of profit gained from handling these on behalf of the editors and printers has been adequately covered operating costs with some surplus available to augment Federal Funds.

DUTY AND SALES TAX

The problem of duty and sales tax applicable to Amateur equipment was "pushed" further this year but I regret to report without solution.

A deal of correspondence between the Executive and the Hon. Allen Fairbairn, M.L.B., VK3BR, Minister for Defence, was bandied in reference to these two problems. Allen Fairbairn took both matters to the respective Departmental Ministers, but despite sympathetic hearing no real solution was found even at this level.

However, the Executive has been assured that further attempts will be made for some relief of the problem. If opportunity is presented, I would again like to record our appreciation of Allen Fairbairn's effort on behalf of the Institute, particularly in view of the previous duty and sales tax duty which have proved to be somewhat formidable.

TECHNICAL MERIT AWARD

In my report last year I recorded the outstanding accomplishment by Ray Naughton, VK4ATH, who created a moonbounce record over 144 Mc distance.

On behalf of the Amateur Service in Australia I am proud and privileged to record here that Ray received the coveted A.R.R.L. Technical Merit Award for his effort. The first copy of this Award has been presented outside the United States of America. It was shared by Ray Naughton, VK4ATH, and Ray Conker, VK4JH. Since then Ray has repeated his earlier, but not record breaking contact, with KENYU.

The Award was a handsome plaque inscribed "A.R.R.L. Technical Merit Award, presented to Ray Naughton, VK4ATH, for advancing the frontiers of Amateur Radio by proving communication via lunar reflection over 144 Mc distance, the realm of conventional Amateur operation."

I was privileged to confer the Award on behalf of the Executive at the Victorian Divisional Convention dinner last year and was officially presented to Ray by Mr. E. J. Wilkinson, Acting Assistant Director General Radio, Commonwealth Government, and representative of the Postmaster General's Department and guest of the Victorian Division.

It is a tribute to an Australian Amateur and I am sure it will be the only time the Award will be presented to an Amateur in this country.

Significantly unknown until recently was confirmation of a 144 Mc distance record between Hugh Lloyd, VK3BC, and T. J. Kendrick, EL3EP, on 23rd December, 1969, over 1,500 miles.

On 876 Mc, a record distance was spanned between Graham Lill, VK3GJ/L, and John VK3DTH, over 1,400 miles. On 144 Mc, a record on the previous record between VK3EZH/VK3EZF and VK4EJ/VK4EJH's when 103,000 miles was spanned.

The records of the credit of Amateur Radio in the years ahead that the accomplishments of individual Amateurs are recorded, which from time to time being recorded, are compiled were to a great extent missing. I therefore would like to impress Federal Council with the necessity for notifying Executive with Amateurs' accomplishments in their own field of our activities so that historical records can really be kept up-to-date for posterity.

AMATEURS IN THE TECHNICAL FIELD

We have all said time and time again over the years that Amateurs played an important part in the technical advancement of broadcasting, television and communication in general.

I was interested to find some substantiation of amateur employment in the field in the staff journal of the Australian Broadcasting Commission—"Radio Active".

It was stated that the Sydney staff comprised part of a Sydney staff and a similar quite long list, I believe, for Melbourne, which I was unable to obtain.

The Richmond branch of the A.B.C. operated an interesting club for Technicians-in-training known as Club 43 South—a reference to the fact that the club was in the 43rd Street. The committee is entirely made up of T-in-Ts which 10 currently are licensed Amateurs and one a W.I.A. shortwave listener.

As provided in the technical field is of great interest and I believe you should

Conference, was really responsible for an immediate plan to organise for such a conference to be held concurrently with the normal Federal Convention in Sydney this year.

Federal Secretary, John Battie, and Assistant Federal Secretary, Peter Williams, followed up David Rankin's liaison work with correspondence, information bulletins to overseas societies and contacts on the air on regular schedules with the South East Asia net and direct schedules with R.G.B. and A.R.R.L.

At this point I wish to record, on behalf of members of the Executive and the Federal Council, my sincere appreciation for the time David Rankin gave in carrying out such successful liaison work at the expense of using his own time when engaged on an extensive business tour.

To me this is a remarkable achievement in a short space of time. Although it has not been possible to have representatives from many of the Region III Societies, I am hopeful that the results from a meeting of the major Societies will result in ways and means being found by which the Amateur Service will grow in the technically under-developed nations of this Region so that regular conferences can be held to which many of the smaller societies may be able to attend. We have a wonderful opportunity to enact "big things" for the future of Amateur Radio in this area of the world and we should make the most of it. I will have great pleasure later on this evening in

welcoming the overseas representatives on this historic occasion.

We should make the most of it because we also have the current opportunity of gaining substantial support from the Australian Government. The late Prime Minister Holt has determined a policy of substantial aid to Asia. Prime Minister Gorton is pursuing this policy as evidenced by his recent statement when speaking in Hobart to a conference of the Associated Chamber of Commerce of Australia when he said, "It was vital to Australia's future to build up the economies of the countries closest to us, and to lift the living standards of the people of these countries."

I believe the policy of the W.I.A. to assist the under-developed countries in Region III, by introducing the Youth Radio Scheme and possibly supplying students with component parts to support their training as a stepping stone to the introduction of Amateur Radio as a technological resource, is in line with present day government thinking.

The government's home policy also supports educational advancement. Prime Minister Gorton, when speaking at the same conference, said, "I know you will want us to devote more and more resources to improving educational facilities for youth, particularly in the field of technology."

If, therefore, we can gain government support for the purposes of strengthening the W.R.E. at home, then we have more to give to Asian countries and be better able to

do it. In the overall pattern I believe we have tremendous opportunities at this stage in Australia's history to prove to our government the findings of the Stanford Research Institute—that Amateur Radio is an international resource for technological, economic and sociological development. If we can successfully do this using every expedient we can command, then I am certain we will have planted the seeds for the future unassailable establishment of Amateur Radio in this country, and indeed, in all countries in this area of the world.

In conclusion, might I express my appreciation to all those who have given so much of their time to the administration of the Wireless Institute of Australia, and to all those who have contributed to other than its administrative activities. Amongst these people I include all the past officers with whom I have worked over the last 18 years, most of whom are still with us and enjoying an up-graded Amateur Service in the growth of which they so capably assisted.

To those remaining on "active duty" I reluctantly say farewell but not goodbye. I hope to frequently have QSOs with you all and when the opportunity exists to have eyeball QSOs as well. To the Wireless Institute of Australia as well, I extend my sincere wishes for its continued success and my appreciation of what it has given to me through my association with its Executive organisation.

Thank you, gentlemen.
G. M. Hull, Federal President W.I.A.

WIRELESS INSTITUTE OF AUSTRALIA—FEDERAL EXECUTIVE

BALANCE SHEET as at 28th February, 1968		1967	1968
CURRENT ASSETS:			
Commonwealth Savings Bank—			
Federal Executive Account	\$7,032.40		
Publications Account	986.08		
Sundry Debtors	263.35		
Stock on hand—at lower of cost or market value	641.94		
Prepayments—Convention	68.00		
	\$9,383.47		
FIXED ASSETS:			
Furniture, Fittings and Equipment—at cost less depreciation	1,122.50		
	\$10,505.97		
TOTAL ASSETS			\$19,889.44
Less—			
CURRENT LIABILITIES:			
Reserve Fund	\$755.00		
I.T.U. Fund	5,414.87		
Australia Project			
Prepayments—Publications			
	\$6,169.87		
ACCUMULATED FUNDS:			
Balance, 1st March, 1967	\$4,365.55		
Less Deficit for year	8.49		
Plus Surplus for year			
	\$4,357.06		
ADITORS' REPORT			
We have examined the books and vouchers of the Wireless Institute of Australia (Federal Executive) for the year ended 28th February, 1968. In our opinion the accompanying Balance Sheet is properly drawn up so as to give a true and fair view of the state of the affairs of the Federal Executive as at 28th February, 1968, and the attached Statement of Income and Expenditure is properly drawn up so as to give a true and fair view of the results for the year ended 28th February, 1968.			
Melbourne, 8th April, 1968. Hobard & Gunning, Public Accountants.			
CONVENTION FUND		1967	1968
Amount Recoverable 1968 Convention brought forward		\$277	
Add Expenses:			
Fares	\$1,061		
Accommodation	151		
Official Dinner	151		
Other Meals	7		
Freight and Sundries	3		
Typing, Duplication of Minutes	392		
Postage, Stationery	4		
Rent, Convention Rooms	40		
	\$1,999		
Less Receipts:			
Bank Interest			
Amounts Recovered from Divisions and Others	\$2,305		
	\$2,305		
Deficiency to be recovered from Divisions		\$21	
STATEMENT OF INCOME AND EXPENDITURE for Year ended 28th February, 1968		1967	1968
INCOME:			
Interest Received	\$147		\$214.98
State Contributions—per capita	1,118		1,125.90
Surplus Publications, Badges	495		\$17.40
	\$1,760		\$1,858.28
EXPENDITURE:			
Air Fare	\$21		\$31.50
Depreciation	136		133.00
Awards, Contest Committee	86		84.50
Federal Tributes	5		10.00
General Expenses	100		\$23.50
Insurance	10		18.55
P.M.G. Licence	3		5.00
G.S.I. Bureau	54		41.18
Maintenance, Office Equipment	13		39.05
Subscriptions	10		30.68
Stationery, Postage and Telephone	261		\$56.78
Salaries	100		\$303.00
Travelling Expenses			108.50
Youth Radio Scheme	50		16.50
General Expenses			1,450
Project Australia			110.48
Badges			44.55
Advertisements			
Federation Expenses	13		
Oscar Project			
	\$881		1,688.77
Deficit for Year 1967/68			\$6.48
Surplus for Year 1968/67			\$227
STATEMENT OF MOVEMENT OF FUNDS for Year ended 28th February, 1968		Total to 1967	Total to 1968
INTERNATIONAL TELECOMMUNICATIONS FUND			
Balance Old Fund	\$89		\$89
Add Contributions 1968:			
New South Wales	\$272		\$300
Victoria	800		800
Queensland	877		877
South Australia	708		1,190
Western Australia	486		486
Tasmania	400		400
Balance carried forward	\$4,312		\$2,414
AUSTRALIAN PROJECT			
Balance brought forward			\$97
Contributions:			
New South Wales	\$80		
Queensland	72		
South Australia	58		30
Western Australia	70		
Tasmania	20		
Donations	35		
Expenditure	\$397		\$77
Deficit transferred to Income and Expenditure A/c	\$397		\$190

Correspondence

Any opinion expressed under this heading is the individual opinion of the writer and does not necessarily coincide with that of the Publishers.

USE OF COMPONENTS

Editor "A.R.," Dear Sir,

I would like to have a few points cleared up, and if you could help, I would really appreciate it. I am a similar letter to one to the P.M.O.'s Department in case they help me also.

Re "Amateur Radio," Nov. 1967, Federal Communications Commission, page 3, Components. You state that "an Amateur can now use whatever combination of components he wishes." This is as long as he keeps within the power limits. I would imagine that a person with a transmitter capable of "over the limit" power would have to take care not to load up over the legal limit. My question is this: Why must an owner of a commercial transmitter such as the FL3000 (Yaesu Musei) operate from the 1400 VDD tapping of the high tension transformer if care is taken not to exceed the legal limit? See copy of the letter on page 21 of December 1967 "Amateur Radio". Limiting the drive to the tube limit would be one way of keeping within the power limit.

I wonder if the Drake TX transmitter would have to be modified on the c.w. position since it is capable of 100 watts d.c. input on c.w. Or would extra loading by the operator to limit the power input to less than 100 watts be enough? I wish to operate within the legal power limit as well as have my equipment meet the requirements of the P.M.G.

—Gene Nurkka, VK6GN.

IFC COMMENT: If FL3000 is operated on the 40v tap, then the equipment operates within the power limit without having to be modified. With the limit on the c.w. position set on h.v. tap it would place the onus on the Amateur to prove he was operating within the power limit, and his equipment would be subject to measurement by P.M.G. officers.

TECHNICAL MINUTE

Editor "A.R.," Dear Sir,

As an OF brass pounder of some thirty years plus experience on the amended P.M.G. regulation, which allows code to be reduced to ten words per minute for the obtaining of an "A" grade.

In most quarters this has been hailed as a good move, particularly among the ever growing number of "B" boys, who now see only a "few words" between them and promotion. Will this reduction in our status codeword enhance our image overall? Eventually it may. However, the Amateur has an implied badge badly needed at this point in time, the decision in the broad sense seems justified, but in my personal view, there are one or two reservations.

What will be the practical result of this change? More "B" chaps will take their full weight of the "A" badge, and will be able to pass the exam at 10 w.p.m. All these in the main will be phone operators. I cannot see this amendment producing any significant change in the number of code operators. If you believe that trying to maintain code proficiency among Amateurs is a "dead cause," then this change is a "dead end" and an implied horse, and there's no point in reading further. However, at the risk of sounding pedantic let me say again that those who should know what the code will be needed for a long time yet.

The perennial problem of creating quality AND quantity in the "A" grade is to be a former that sets the level of our "image." I don't think anyone would argue with the reports coming from the States on the state of the "A" grade. No one in the States respects the General class ticket ranks. In operating techniques, quality of transmissions, cleanliness, and (use general overall) social behaviour, the aforementioned would be inferior to the "advanced" ticket holders.

Of lesser import is the fact that OTs and other persons who have been connected with communications and are good AI operators, nor relish having their Amateur ticket rank reduced to "B" class. No, assuming that Code is still considered a practical necessity, and a skill to be encouraged, I cannot see this relaxation to 10 w.p.m. helpful at all. No one in the States would want it.

Only when two changes are made, will there be a significant improvement in the Quantity and Quality of Operators.

Firstly, The newly acquired ticket-holder must be required to serve, as a 12-month

period on some allotted section of the bands (possibly ten), and show a minimum number of logged QSOs on AI Mode. Only the P.M.G. can create this situation, and deal with past policies and traditions is long overdue. With full respect, it might be felt that the Department is this time suffering from lack of interest, or imagination.

Secondly—The W.I.A. needs a more intimate, professional and psychological approach to the Code tuition. True, the finance is not available to provide such facilities. Second, such would be code operators are incorrectly conditioned at the beginning. This is the vital time for the code tuition, and it is being done fluently. It is here that the beginners fall before they have commenced.

I must disagree in part with Federal Executive comment, "That 10 w.p.m. is considered effective for commercial use." Such a general work, this is hardly so, and can be easily demonstrated. Work at this pace for an hour, say on 20 metre with the band open, one soon begins to feel like the driver doing 30 m.p.h. on a 70 m.p.h. freeway. The pace has considerably quickened these days.

True, 10 w.p.m. is not a speed for working in very QRM, QRN and other adverse circumstances, but no novice could cope with these conditions at any speed.

Remember, much as we need more Amateurs, it is quality that is needed.

—A. Shawsmith, VK6RS, I.A.R.E.

YRRC

MATLAND RADIO CLUB

A great honour has been bestowed upon the members of the Matland Radio Club. In March it was announced that the Matland Radio Club had been awarded the "Institution of Radio and Electronics Engineers" pennant for 1967. This award is made annually to the most efficient radio club in the country. It is a great pride that the members have for their achievements during the first twelve months of operation, during which they gained 1 credit and 17 honours grants. The club's examination held in October and December.

Congratulations have been received from as far away as South Australia, the most notable being from the Matland Radio Club, the Fairhall (VK6KB). Activities planned for the next twelve months are the Y.R.R. Junior exams, followed by another Elementary exam, and one A.C.C.F. exam, which several members wish to contest.

Further proof of the club's rapid progress is in the leasing of a block of land from the Matland City Council for \$1 per year. The land in Main Street, East Matland, is in an excellent position and emphasises the faith that the City Leaders have in the prospects of the radio club. The building is available and will be moved to the site and prepared as a workshop as soon as possible. Plans are in hand for the erection of large clubrooms. Although the completion of this project is very much in the future, members feel that the work and much of the negotiations will result in a radio club that the City of Matland will be proud to call its own.

On 25th Feb, 16 members attended the Gosford Field Day and extend their thanks to the organising committee. The day was very successful. The first few months of the year have been busy ones for the club. The Committee has been reformed and accepted, and a QSL officer has been appointed. The club for the s.w.l. section of the club. This is in addition to the events enumerated above. The club membership now stands at 23 with the latest members being Rodney Sams, East Matland, Rudy Meinama, Matland, Stephen Walker, Gosford, Rodney Sams, East Matland, and Paul Sorenson, Lorn.

Trevor Whetton, who has been appointed as QSL officer, supports the club's appeal for short wave or dual wave receivers that could be used for the club. The club is also seeking from VK6WJ and VK2AWX, as well as other short wave bands. This would enable more members to take an active part in the short wave listeners' section of the club.

Lectures will continue to be held in the Matland Technical College on Friday evenings at 7 p.m. Further information about the club and its activities can be obtained from the Secretary by phoning 33-7286, or by writing to P.O. Box 54, East Matland, N.S.W. 2233.

SOUTH AUSTRALIA Y.R.S. CONVENTION

On Monday, 29th Jan., a State Convention of the W.I.A. Y.R.S. was held in Elizabeth. This was the first time it has been held in South Australia and the Elizabeth Amateur Radio

Club acted as hosts for the occasion. The State Co-ordinator of Youth Radio, Rev. Bob Guthrie, chaired the gathering and representatives from all clubs were present, including the Vice-President, Mr. Geoff Taylor.

Sixteen delegates representing seven Youth Radio Clubs and the W.I.A. attended the Convention. The gathering took place at the Pire, Port Augusta, and Pteridobora. Other clubs represented were Kadina H.S., Nalla-worth Boys Technical High School, Christie's Beach, and the W.I.A. Club.

Reports on Youth Radio Scheme activities and club programmes were presented by each club and points of common interest discussed. The evening was held in a most pleasant atmosphere as the various courses, the setting and marking of exams, for the various grades of certificates and other similar matters were discussed. Mr. Allan Dunn, Y.R.S., was appointed State Secretary of the Y.R.S.

A further similar meeting has been arranged to be held in June following the National Convention to be held in Melbourne.

"ELEMENTARY RADIO COURSE"

This is a "book", printed on Gestatner, foolcap pages, which covers all the topics in the Elementary Radio Course. It is written in sections so as to facilitate use as a correspondence course or as a fortnightly "handout" for an attendance class. The course includes an introduction to the club, theory and questions on those notes and the answers to these questions. The 6 fully packed close-up typed pages of the book cover the course. The last section's questions are in the form of a typical exam paper for the certificate and there are no answers given for this.

The "E.R.C." is used by the Group Leaders of the Correspondence Section, I.A.R.E., to instruct members. Many club leaders around Australia are using it to instruct the members of their club. Some clubs hand out one copy to each member at \$5c a copy this is well worth it. In Canberra there are four clubs which hand out a copy to each student—on the date figures are available from any one of these as to the success of this system; the C.Y.R.C. reports excellent. Correspondence instructors of this course are also excellent and the students' exam papers reflect this.

Private study students who wish to use it as a text book will find it quite useful and they will be able to progress at a reasonable standard. Of course having an instructor will help, but if you could not afford the \$5 membership of the Correspondence Section, it is well worth a single copy of the course (\$6c) and also send a subscription to "Coryra" (\$1).

There are several forms in which one can purchase "E.R.C.":

ERC1—Bulk, loose copies, sections separate, 50c.

ERC2—Bulk, stapled into books, in the page number order, which means the answer pages follow each section. 90c.

ERC3—Single, book form. 60c (stapled).

ERC4—Single, loose, sections and answer pages separate. 90c.

ERC5—As for 2, but in manilla folder, stapled well. 65c.

ERC6—As for 4, answer pages in sealed envelope. (Answer pages have other topics on the inside and the student does not leave in envelope for too long.) 60c.

ERC7—Bulk 5, 60c.

All the above prices include postage within Australia and Territories.

(Subscriptions to "Coryra" are really value for money if you are interested in radio/telex work. The "Coryra" is a 100-page book sent along with an "E.R.C." order. "Coryra" orders will be passed on to the "Coryra" Secretary via our internal mail—save you an extra stamp. To order one year's "Coryra" we only need \$1 plus name and address. The "Coryra" subscription manager is Mr. J. A. Byrne, 113 Monaro Cres., Red Hill, A.C.T., 2603.)

QRP CLUB NEWS

DX member stations number approx. 300. U.S.A. can show a count of roughly around 1,000. This is the club is growing steadily and many are showing out big in DX achievements. More! The antenna is more important than the power input. It is possible that the QRP club is growing in South QRP contest on its own for world participation. Anyone with ideas on this might drop Barry VK6WJ. Any worthwhile suggestion is always welcome.

FEDERAL AND DIVISIONAL MONTHLY NEWS REPORTS

(SEND CORRESPONDENCE DIRECT TO DIVISIONAL REPORTER NAMED AT PARA. END)

FEDERAL

MEMBERSHIP RETURNS

	Feb.	Feb.	Feb.
Month ending	15	14	14
Life	288	288	288
Full	147	147	147
Associate	141	141	141
Others	14	14	14
TOTAL	1976	1107	808
Previous Total	(1978)	(1101)	(808)

Grand Total, All Grades: 4087 (4838).
Grand Total, Full Members: 3888 (3065).
Equals 51.5% of Licensees (51.5%).

Grand Total, All Grades: 4087 (4689).
Grand Total, Full Members: 2888 (2888).
Equals 51.8% of Licensees (51.8%).

LICENSED AMATEURS

(Figures for December, 1967)

	Full	Limited	Total
VK1	79	19	98
VK2	1257	15	1272
VK3	1137	242	1379
VK4	470	187	657
VK5	688	67	755
VK6	588	131	719
VK7	123	19	142
VK8	19	19	38
VK9	6	12	18
VK0	0	0	0
Totals	5099	505	5604
Previous Totals	(5054)	(1397)	(5548)

I.T.U. CONFERENCE

The Maritime World Administrative Conference, which was convened by the I.T.U., ended on 3rd November. Amongst the main decisions of the Conference were the following:

"The gradual introduction up to 1st January, 1978, of single sideband radio telephone technique in the high frequency bands between 4000 and 23000 Kc. allocated to the Maritime Mobile Service. The Conference also recommended that a world administration radio conference should be convened in 1978 to establish a new frequency allocation plan for sharing out the new single sideband channels to the coast stations."

This is the first recommendation that has been made for the holding of a World Administrative Conference but the recommendation is not automatically accepted by the I.T.U., nor does it preclude I.T.U. from deciding to hold such a World Conference before 1978, or deciding to hold Regional Conferences rather than a World Conference before or during 1978. However, the suggestion of 1978 should be noted by the Amateur Service, and W.I.A., and preparations should be made to meet the possibility while being mindful of the poor possibilities of Regional or World I.T.U. Conferences.

FEDERAL QSL BUREAU

The QSL manager for VK0IA (Macquarie Island) turned out to be Greg Johnson, VK2JL, who did such a good job in a similar capacity for Macquarie stations VK0MI and VK0CH. Greg's new QTH is 215 Cottrell St., Sydney, N.S.W. 7015. My pace in March "A.R." seeking the identity of the QSL manager for VK0IA brought forth a heartwarming response in the shape of offers to act as QSL manager from Bert Behenna, VK2BS, and from VK2GZ. Thanks for the offers please.

Later news from the Edo Tracking Station at Cove N.T., now indicates that VK0JL is unlikely to be heard on the h.f. bands on any more for some time, because Tubby Vale, VK0NO, who was kept VK0JL very active, returned to Adelaide at the end of March. VK0GU preceded Tubby south a few

days earlier. Only Amateur presently on the site is VK0ZRA. Sue Ward will attend to all QSOs for VK0JL, hopes to get back to Gawler but will enjoy two months' leave before settling down. It is quite possible Eastern stations may receive a visit from Tubby during this period.

Any information on disposal of QSLs for VK0JL, W. J. Wirth, Nauru, would be appreciated. Have written but mail services to Nauru are slow and irregular. Anyone contacting him could perhaps obtain the information.

Amateurs throughout the world are invited to participate in the contest for the Centenary of the French Physical Engineer Doctor Gustave Ferris, the father of useful transmission of radio—before 1908—and became general of the French military radio system in 1918. Gustave Ferris is the first "Membre d'Honneur" of the R.F.E.

Date: C.W. and Phone, 24th May, 1901 GMT, to 26th 1900 GMT.

Contacts: All QSOs are valuable on all Amateur bands (5.5 to 30 Mc.). A contact with the same station can be repeated on the same band with any other mode of transmission. Fifteen minutes minimum must elapse between these two QSOs. In the meantime, the station can QSO other stations.

Calling: CQ Test Ferris.

Exchange: CQ Test Ferris and number of the QSO (first QSO, 001).

Points: (a) for each QSO, 1 point; (b) for each band worked, 1 point; (c) for each mode of transmission on each band, 10 points.

Score: (a) plus (b) plus (c).

Logs must contain: Date, time GMT, bands, exchanges and each QSO which gives extra points must be underlined.

Each participant will receive a Commemorative Card. The first of each country will receive an award. Logs must be sent before 1st July, to: R.E.F., B.P. 42-01, Paris R.F.E., France.

The Venice Section of the A.R.R. inform you that on the occasion of the St. Mark Day Protector of the City, each contact effected on this day-time with stations of the Venice Province will double the value for the Serenissima Award. The Serenissima Award entails contacting five stations in the Venice Province of the A.R.R. after 1st Jan. 1968. Applications with QSLs and 10 I.R.C. to the Awards Manager, IYVAD, P.O. Box 181, Venice, Italy.

Members of the Y.I. International Sidebands are reminded of the QSO Party, 17th May to 30th May inclusive. A novel presentation is being arranged for their First Lady to be presented at the second Convention in New Orleans, L.A., from 21st May to 2nd June. DX members who would like to participate in this novel matter should contact Alf VK0JL at 1538 High St., Glen Iris, Vic., 3146, or to Jessie WAS0BT.

—Ray Jones, VK3BJ, Manager.

FEDERAL AWARDS

The following are the awards issued by the W.I.A. through the Federal Awards Manager:

Australian D.C.C.C.
V.F.R.C.C. (6 mx and 3 mx).
C.W. (V.I.)
WA-VK-CA Award (Overseas stations only).

There appears to be some confusion regarding overseas awards, especially the V.F.R.C.C. D.C.C.C. and W.A.S. These can only be issued directly from the A.R.R.L. and QSLs MUST be sent direct to the A.R.R.L. headquarters where application is made for the award. The A.R.R.L.

SILENT KEYS

It is with deep regret that we record the passing of the following Amateurs:

VK2BG—Bruce Glasco.
VK2GQ—Ted Barlow.
VK2JLH—Dick Rutherford.
VK3JHY—H. L. Andrews.

W.I.A. cannot handle applications for these awards, or certify check lists, etc.

The W.I.A. (Worked All Continents) award is issued by the I.A.R.U. and applications can only be made through the W.I.A. as only Amateurs belonging to a Radio Society affiliated with the I.A.R.U. are eligible for this award. To obtain this award the applicant must be able to prove two-way contact with a station in each of the recognised continental areas: North America, South America, Europe, Asia, Africa and Oceania. Certificates are issued for Phone and C.W. and stickers are given where two-way a.s.b. is proved. Applications should be forwarded to the Federal Awards Manager with a check list accompanying the QSLs. The check list must show normal award application details of time, date, station worked, band, RST, sent/rcvd., etc. Cards will be checked and the results sent to the applicant. Please enclose sufficient postage to cover cost of returning the cards plus forwarding of the application to the I.A.R.U. headquarters in the U.S.A.

"CQ" Magazine Awards: The main award issued by "CQ" is the W.A.Z. (Worked All Zones). To obtain this award the applicant must have QSLs to prove two-way contact with a station in each of the 40 zones of the world as defined by "CQ". Zone maps and application forms are available from the DX Editor of "CQ" by sending a s.a.e. and one I.R.C. to: DX Editor, P.O. Box 205, Winter Haven, Florida, U.S.A.

Cards need not be sent overseas and will be checked by the Federal Awards Manager W.I.A. provided the following rules are observed: (1) Applicant files a duplicate application form with QSLs. (2) Applicant includes sufficient postage to cover cost of return of QSLs and forwarding of application to the U.S.A. (3) Applicant includes eight I.R.C.s to cover issue of certificates. (This is the charge made by "CQ" Magazine.)

At present the awards listed above are the only ones being handled by the Federal Awards Manager, however negotiations are under way with various Sections of the I.A.R.U. for when any other applications can be checked locally Amateurs will be advised through this column. Please note that the cost of sending cards overseas and every effort is being made to arrange for local checking where possible.

—Geoff Wilson, VK2AMX.

NEW SOUTH WALES

MARCH MONTHLY MEETING

An excellent attendance of some 80 members was present at the Wireless Institute Centre on Friday, 2nd, for the Monthly and Annual General Meeting. The first meeting was opened by President Chairman Keith YR3J. The minutes of the Feb. meeting were read and after correction of a minor error were received in order. Applications for membership from 22 persons were presented to the meeting. Visitors included VK4ZDZ, the VK4 Y.I. Supervisor, R.E.J. and VK2BMX.

The Chairman called for nominations for the Advisory Committee. The existing committee, plus one other member were nominated so that the requisite names will now be forwarded to the N.M.C. for their selection of the three-man committee.

ANNUAL GENERAL MEETING

Immediately following the adjournment of the monthly meeting the Annual General Meeting was opened. The minutes of the A.G.M. of last year were read and accepted on motion. Following on, the Chairman, Keith YR3J, advised that due to re-organisation of secretarial services, the Auditor's report was not yet ready. However, a preliminary balance sheet had been prepared and was read to the meeting by Councillor Dave Johns, VK3BSJ, who concluded his report with a complimentary sheet. Dave answered some queries on various entries, and both Dave and Keith explained some of the items in detail, especially the disposal of the 3rd Floor Sydney office.

The Y.I.S. Annual Report was then read out by Dave VK3BSJ, and on conclusion a commendable 10 min. discussion on the Y.R.S. was given by Keith, and again some discussion ensued on the Y.R.S.

TED BARLOW, VKBQQ

FRANK STORRE, VKI ASSOCIATE

Frank Stobbs died suddenly on 23rd March from a heart attack. He is survived by his courageous wife Gwen and his two children Janene and Frank. During his 62 years, Frank Stobbs did much to help the Amateur Service. We will not forget him.

U.S. SERVICEMEN R. & B. LEAVE

It would be indeed a great idea to be able to hand the mike over on a W contact and have the W veteran QSO with a home-town Amateur. If you would like to assist them contact the Secretary or the R. & R. Centre in town—they know about it and will gladly take you up on any offers.

MORSE TAPE SERVICE

To obtain a copy of the tapes you send up 30 cents per tape to Ern Hodgkins, VK3EII, Mangrove Rd., Narara, N.S.W. 2331. Send a postal order or similar (not by stamp) to cover postage of the tape and kindly return the tapes when you are finished with them in the box they came in. The service is available to all members in all States. Don't forget to advise the speed and number of tracks of your machine and remember that the exam speed is now 16 w.r.m. only.

RADIO EQUIPMENT STORE

地址: 北京市海淀区中关村大街100号 邮编: 100080

During the Annual General Meeting, in discussing the lease of the lower section of Acheson St. premises as the Store, the Pres-

HUNTER BRANCH

Henry ZEKZ didn't quite make the foreign land, but he did make as bold as to journey to Melbourne during a month of his vacation and he is still singing the praises of the chap who gave him such a good time in VK3. After he had told Eric ZEVH of his having left the g.d.o. behind where the grass is nice and green, aforementioned Eric invited him in and Henry had the full facilities of the workshop

Operation "clean-up" was launched by the working-bee against the prolific guinea-grass growth around the clubhouse area. The heavy spraying with the "42FR special" poisoning fluid, after hard work with mattocks, etc., should ensure a few months respite—no fun, this type of thing.

His activity around the area has been lessened somewhat by the absence of Hal 4CQ—the prolific DX specialist—but Geoff 4XZ has held the fort nobly.

Country members John 4NZ and Harry 4LE are often heard in the 40 mX early morning group hook-up. Old-timer Joe 4CL is still in hospital and would appreciate a visit from any of the lous. Amateurs if possible. There would appear to be a possible convert to 52 Mc. In the office, as Eric 4EC was recently heard on the 40 band in the throes of testing a transceiver device!

Regular monitoring of the V.H.F. Group activities during the month shows that the 6 mX gang are really keen—regular openings to far eastern climes have provided daily JA DX, and constant operators Frank 4ZFR, Bob 4NG, Doug 4ZDK, Gordon 4ZGA and Lyndsay 4ZIM have been filling up the log books with a plethora of JA call signs. Congratulations also to 4ZFR for his contact with K66VY recently—nice work, other K6s calls have been heard but no contacts made. The old maestro, Bob 4NG, has been carefully listening for the extra-range DX, but reports no luck to date. The powerful signal of Lance 4ZAZ has been missing of late due to his absence in southern areas in business attire.

Don 4ZFE—our man in Bluelie—has been working into JA consistently and tells me he now has made the 6 mX antenna system fully rotational—locks like the DX contacts are due for a sharp upward tally! There is some talk also about a hi-power rig in the near future!

There appears to be an up-surge in building projects in the V.H.F. group of late. One hears that 4ZGA is working hard on a new 50w. rig, Charlie 4ZBG also planning a new tx; Frank 4ZFR is in the semi-throes of planning a super control panel to operate his complex of tx's, tape recorders, etc. Geoff 4ZFK at long last has put the 35w device into operation on 6 mX—he's been threatening this for a long while, but now it's a fact. Doug 4ZDK, dividing his spare time between Amateur Radio and extensions to his 4ZTS. Lyle 4ZLD has been working on several projects—never seems to rest, this chap!

An item to mention, also, is the interest in Morse practice by the V.H.F. Group; through the good offices of 4ZFE, we are provided with regular Morse practice and several 2 calls hope to attack the May exam. Have not heard mention of any visiting Amateurs through the city, but the 40 mX of Townsville, who called up on 53335 and met some of the gang. We hope to see him on return from his southern holiday.

Late News: Short opening to VK3 and VK5 on Sunday, 31st March, produced some 8 x 9 signs

and the locals renewed acquaintance with 5ZDX, 5ZMW, 5ZUL, 5ZK, 5ZYG, and 5ZQB. Nice to meet them again, and we are looking forward to the southern DX season to carry on the QSOs.

In closing, may we again remind any visiting VK guests, please call CQ on 53035 or use the 800 Ohm system as mentioned in the April notes. We like to meet fellow Amateurs and make them welcome. 73, Lyndsay 4ZIM.

BURBANK AMATEUR RADIO CLUB

The Annual General Meeting was held on 7th Feb, and was very successful with a large attendance of members. The retiring President, Les VK4FKX, outlined the activities of the club during 1967. It was a most successful year and Les thanked all those who helped during the year.

The election of officers was as follows: Patron, Mr. D. G. Rattray, President, Jocelyn VK4JJ, Secretary, Don VK4KK, Treasurer, Geoff VK4GI, A.O.C.P. Class Instructor, Key VK4ZWR, Morse Instructor, Geoff VK4GI; Dave VK4DI. All other official positions were filled by various club members.

The Bundaberg and Ipswich Radio Clubs held a combined field day at Borumba Dam on the week-end of 24th-25th Feb. Members were loud in their praises of both the facilities and the scenery and the many courtesies extended to us by the officer-in-charge, Mr. Cliff Holloway, and his staff.

There was a total attendance of 30, being made up of Amateurs, A.O.C.P. class members and XVLEs. Fox hunting, swimming and Scuba diving were among the activities enjoyed. The Ipswich group gave a very interesting display of colour films and slides of the various club activities.

On Sunday morning, Geoff VK4GI set up his transistorised s.s.b. rig and participated in the VK4 hook-up and made many other contacts on 40 and 20 mX. Bob VK4UD set up a 6 mX station on the Water Tower Hill at Imbil and worked quite a few stations. 6 mX mobile activity was very high throughout the week-end. Several people including Bill John from Ipswich and yours truly were kept away due to sickness and other misfortunes. General comment was that "we must do it again some time".

The 6 mX band is wide open to JA land from Bundy at the moment and yours truly worked 8 JAs and JEs in a couple of hours, mostly 5/9 signals.

The A.O.C.P. and Y.R.S. classes are once again in full swing. The Y.R.S. class has a membership of over 30 and the accommodation situation is a bit embarrassing to say the least. Club President, Jocelyn VK4JJ, presented 7 certificates to successful candidates at last year's exam.

The March meeting was very well attended. At this meeting we accepted the Division's invitation to stage the Queensland Convention again. At the moment the club and the Central Queensland Branch are in the process of organ-

ising a camping week-end at Tannam Sands, which the club members are looking forward to with anticipation. 73, Rusty VK4JM.

TOWNSVILLE AND DISTRICT

At the last monthly meeting of the local club, the opportunity was taken to visit Channel 7 at the top of Mount Stuart. Twenty-five members took the trip and thoroughly enjoyed all that they saw. Even the female office staff! One must say that the view from the windows of the building that overlooks our fair city has to be seen to be appreciated.

The outing was such a success that arrangements were made to repeat the April meeting. A visit was arranged to D.C. So once again the newcomers will enjoy their meeting nights. It is also proposed that people from all walks of life be invited to give the tour to everyone. Even have a couple of University Professors in view.

Bert 4LE is now on the air with a new Galaxy after being modified so that the regulations will not be broken in its output. Seems to be making a welter of working new countries for DXCC. Mary 4DV has weekly QSOs with the Townsville boys on 3.5 Mc. Short sign seems to be the order of the day as even Monday can hear 4CZ on Fraserpine.

The 2 boys are still working through Japan on 54 Mc. Some are trying for the Morse at the next exam. The photo of the Ipswich Radio Club to be sent to the club to be used locally on their toes to get their own under way after approval for the land comes through. As the Tourist Season is about to commence, you might like to advise the boys that in Australia remember to call in and meet the locals either at their shops or at the corner house, where the drought being broken. 73, Bob VK4RW.

SOUTH AUSTRALIA

The monthly general meeting of the VKS Division was held to appoint standing members and visitors, so much so, that extra seating had to be provided to take care of the overflow. The President, Tom 7PT, opened the meeting on time and with a few well chosen words introduced himself as the new President, at the same time explaining that the members of his Council of 12 would all in their power to advance the Division, but very little could be done without the help of the members. He then presented a report. He recommended that members read the opening article in the Journal for March, written by Arn 5KV, and mark, learn and inwardly digest.

The Secretary, Al 5EK, then informed members that it was expected that supplies of the VKS Handbook would be available soon.

The Federal Councillor, Geoff 5TY, had little or nothing to announce on Federal matters, and after a little discussion on matters purely domestic, the meeting was given over to the QSL Officer, George 5RX, for the distribution of QSL cards.

The meeting was then called to order and the highlight of the evening was announced, to wit, a jumble sale—buy and sell to you—and the auctioneer introduced with a fare of trumpet, which all fell flat because the auctioneer was out of the room. Anyway, the introduction followed, and to tremendous applause, the auctioneer returned. An unassuming example of Amateur Radio stepped up to the rostrum prepared to answer the last cent from his unwilling audience. Nothing much more was said except the evening seemed to enjoy themselves no and, especially the auctioneer, and the night closed at the bidding hour with 1000 guests more than satisfied with the entertainment provided. What's that? Who was the auctioneer? My modesty does not permit. I blush so easily you shall keep it a secret! Just try and guess!!!

Was talking to Pete 5FM prior to the meeting and he was saying that VK3 were doing a little scurrier than bees teeth, and deplored the inactivity on the bands these days. I definitely agree with him, there was a time when I could not get any more by listening on the bands but these days I have to rely on the reports from a couple of trusty agents discreetly planted in the right places.

Les 5NJ recently thought he would work 5NY because he had never heard this station before and felt that he needed encouragement. He nearly had a couple of fits in push pull parlour to find out that 5NY was none other than that doyen of the c.w. gang, our Treasurer Harry, on the air to get some experience with push pull in preparation for working SWL. Harry was cut to the quick.

Alan 5ZX was an old-timer notified at the meeting, and I was pleased to have a chat with him, although a certain cinders chased

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over the years acquiring all sorts of items (ex disposals, which seems to have aroused the enthusiasm of Neil SWN Vera was heard to

erty to give his two boys and a girl better opportunities in their studies. One is now a doctor at Fort Pirie, the other a doctor at Daws Road Hospital, to say nothing of the daughter well on her way in science studies. So it is no wonder that Perce is well satisfied with his decision to move to the city—and just a teeny weeny bit proud of them. Perce? Gilbert SGX back from his vacation at Victor Harbour and tells me that there are now quite

Take our stalwart Broadcast Officer, Bob TUBE, for example. Why just the other evening he set out on a short journey, with nothing more than a flashlight and a few dollars. A member of the family from night school. However, even the shortest of runs can be hazardous in these modern times, and Bob soon became painfully aware that ALL was NOT what it seems. He was sure that one of the tires was making like it had a permanent flat side. Closer inspection revealed that this was definitely the case, it was definitely flat. He was sure that the tire was the cause of the setback by the lateness of the hour and lack of illumination. Bob set about the problem of finding and fitting the spare wheel. Finally he found it, and after a few comparisons and a good deal of fiddling, he was able to proceed in the approved manner to make the vehicle roadworthy. This was soon accomplished—after all, it doesn't take long for an expert to do five minutes' work, and Bob was no exception. The replacement of the tire, in the hood, slammed the lid and stood back wiping his hands in satisfaction as one usually does at the end of a job well done.



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Listed below are the highest twelve members in each section. Position in the list is determined by the first number shown. The first number represents the participant's total countries less any credits given for deleted countries. The second number shown represents the total D.X.C.C. credits given, including deleted countries. Where totals are the same listings will be alphabetical by call sign.

Credits for new members and those whose totals have been amended are also shown.

PHONE			
VK6MR	317/238	VK4HR	285/208
VK3AKO	314/285	VK4PJ	279/286
VK6RU	307/230	VK3TL	262/288
VK6MK	304/221	VK3APK	256/288
VK3JZ	306/215	VK4TY	256/287
VK3AB	305/214	VK3AJX	246/248

C.W.			
VK3QL	300/280	VK4HR	288/280
VK6RX	291/218	VK3NC	286/238
VK4PJ	291/215	VK3ARK	285/274
VK4QM	291/213	VK3XB	284/285
VK3AHQ	288/201	VK3XB	259/278
VK3AGH	281/294	VK3APK	287/284

New Member:	
VK3EA	100/101

OPEN			
VK3AGH	310/258	VK4PJ	288/218
VK3BU	309/228	VK4TY	285/207
VK3VN	306/221	VK3FO	283/214
VK4HR	306/227	VK3ARK	287/288
VK4QM	306/226	VK3TL	281/285
VK6MK	305/222	VK3AJX	276/280

Note: The D.X.C.C. list has been amended. Credits for the operations listed in last month's notes has been withdrawn.

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KEW-66 MULTITESTER

Range: D.C. and A.C. Volts (20,000 ohm/volt): 0-1, 2.5, 5, 10, 25, 50, 100, 250, 500, 1,000 volts. D.C. Current: 0-50 microamp, 0-2.5, 25, 500 mA. Resistance: 0-5K, 50K, 500K, 5 megohms. Decibel: minus 20 to plus 32 db. (0 db. equals 1 mW, in 500 ohm). Uses printed circuit and incorporates mirror scale for high accuracy readings and a built-in overload protection device.

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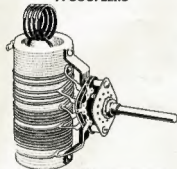
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5/8 in.	\$2.60	1-7/8 in.	\$8.00
11/16 in.	\$2.80	2 in.	\$8.40
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13/16 in.	\$3.20	2-1/8 in.	\$9.00
1 1/8 in.	\$3.30	2-3/16 in.	\$9.40
1 1/16 in.	\$3.30	2-1/4 in.	\$9.60
1-1/8 in.	\$4.00	2-5/16 in.	\$9.80
1-3/16 in.	\$4.00	2-3/8 in.	\$10.40
1-1/4 in.	\$4.00	2-1/2 in.	\$11.00
1-5/16 in.	\$4.20	2-3/4 in.	\$12.40
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5/8 in.	\$2.00	1-3/8 in.	\$4.08
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3/4 in.	\$2.20	1-5/8 in.	\$4.44
13/16 in.	\$2.50	1-3/4 in.	\$4.44
7/8 in.	\$3.08	2 in.	\$5.50
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Current Drain	15 mA. max.
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